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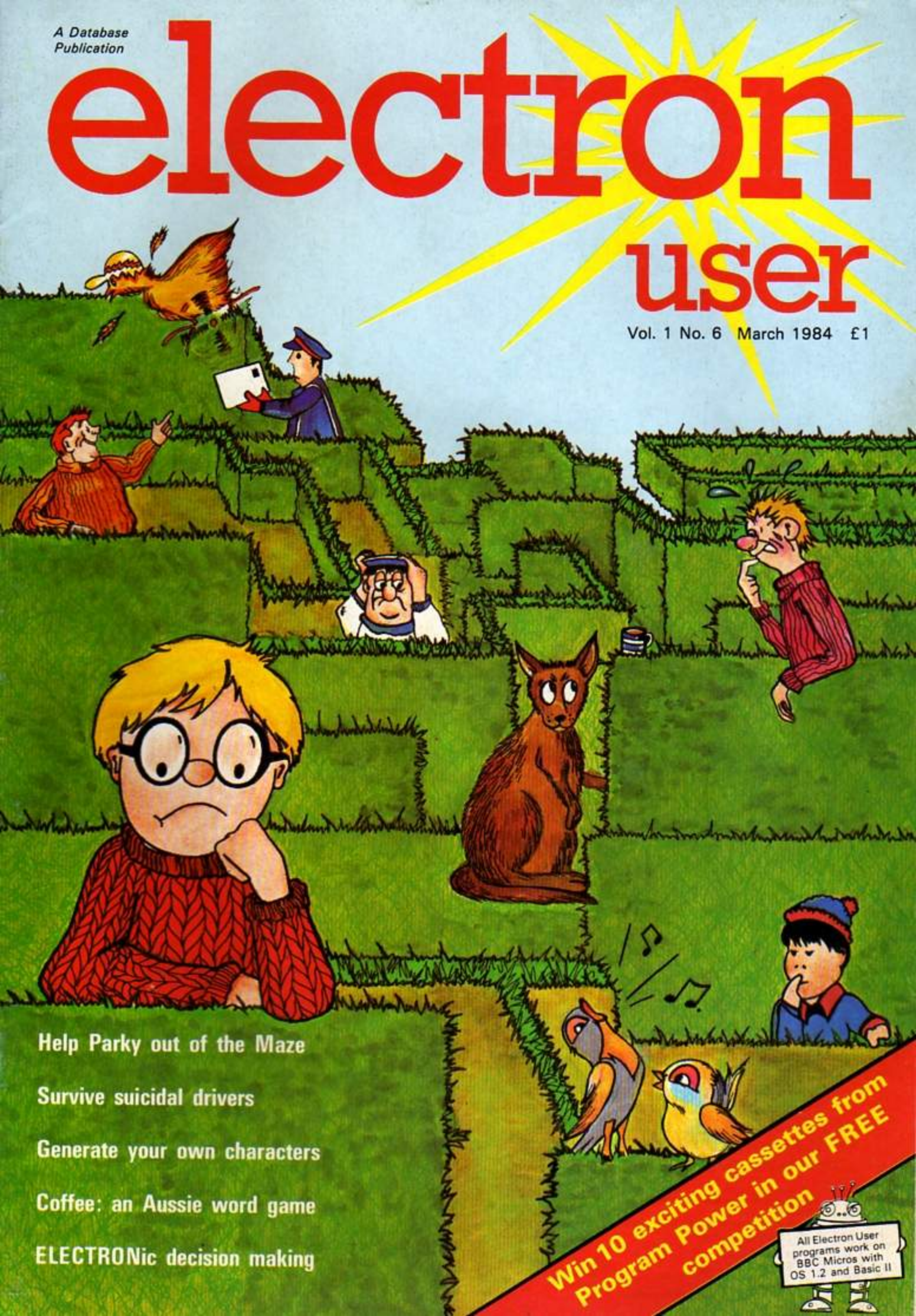

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Electron User welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

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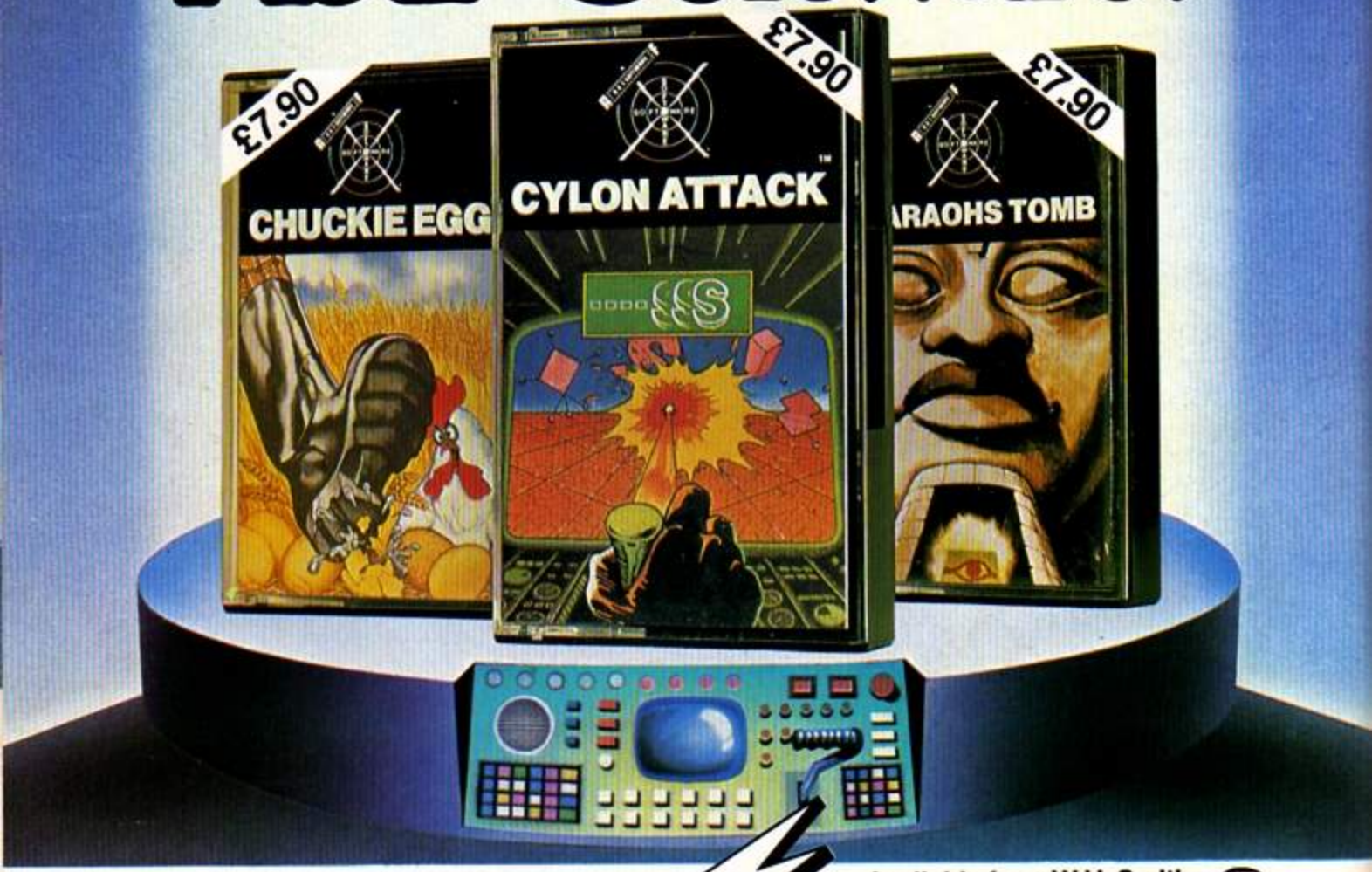

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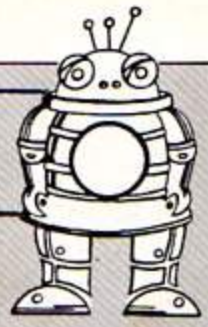

RIGHT from when *Electron User* was launched six months ago we have described it as a magazine written for and by Electron users.

That last bit, the "by Electron users", is what I want to talk about this month.

I want to stress that *Electron User* is written entirely by Electron users – which means you and people like you.

As it is, we've already received a lot of material. We've had a tremendous response to our requests for Casting Agency characters and noises for Sounds Exciting.

Now we'd like you to send us YOUR programs. We're never satisfied!

And don't think that you can't do it, that you couldn't write something that will appear in print, because I know that you can.

Someone once said that everyone has one novel inside them and I strongly believe that everyone has at least one original program inside them.

I'd like to see it in the pages of *Electron User*!

You'd be amazed at the number of times someone shows us a program that we'd love to use and says: "But you won't be interested in that . . .".

And don't make the mistake of thinking that for something to appear in *Electron User* it has to be written by someone with twenty degrees in computer science or one of these computer whizz kids you keep reading about. It's YOUR programs we want.

If you go to the time and trouble of writing a program it must be because it's of some use or interest to you!

And if it's of interest to you then it'll probably be of interest to another Electron user, won't it?

So let's have your programs and articles. Short ones, long ones, serious ones, joke ones, simple ones, complicated ones – they're all welcome.

Take a look at the magazine and see all the different types of listings we carry.

You might not be able to write an arcade style game but what about something for our Notebook, which this month is on Page 20.

Could you write a simple program for that? Or perhaps you could turn out a graphics program for us.

Each month Nigel Peters will be examining the working of a short program.

Why not send him yours?

We've already got some excellent writers but we can always use more.

So, if you're a Yosser, if you look at the magazine and say "I can do that" – here's your chance.

Let's have your cassettes with your programs on them to:

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Remember, if you're an Electron user, then *Electron User* is your magazine.

Help us to give you the magazine you want by sending us your programs, articles, letters and comments.

Pete Bibby

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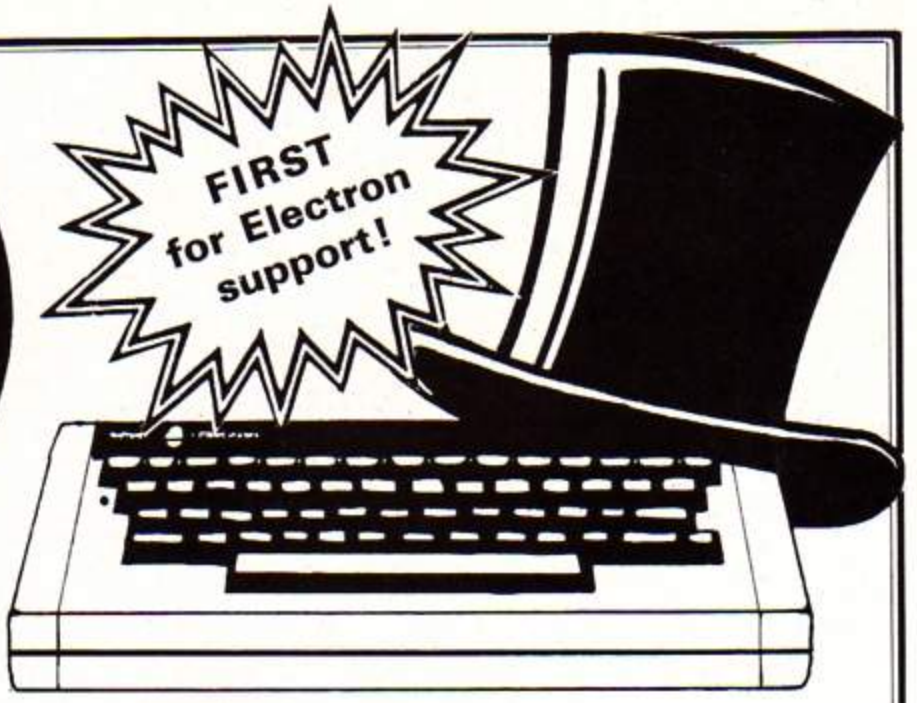

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electron user NEWS

Pamela Hauser receiving the award on behalf of her husband from Ian McNaught Davis, presenter of the BBC TV series.

SMITHS EXPECT BUMPER SALES

THE Electron is all set to come second only to the Spectrum in sales through the W.H. Smith computer shop outlets during 1984.

"It's going like a train", John Rowland, the group's marketing manager, told *Electron User*.

"We could certainly sell far more than we can get hold of at the moment as there is still a problem in getting sufficient supplies".

No actual sales figures are available at the present as the company has changed its financial year end from January 31 to May 31.

"Because of this we are in what is described as a 'mute period' and I am not allowed to reveal the actual figures", said Mr Rowland.

But he did admit that there are already clear indications that the Electron is going to be a very successful machine this year.

Nor does he base this prediction entirely on the number of machines W.H. Smith hope to sell through their micro shops.

"Naturally we take this into account", said the marketing manager, "but what is of equal importance is the level of interest being shown in the Electron from peripheral manufacturers and software houses – and that is tremendous".

New course

FIRST on the scene with a correspondence course for the Electron is Walrus Computer Education.

Their 10 lesson teaching pack on Structured Basic sells for £24, including software cassettes.

Electron chief wins 'Oscar'

HERMANN Hauser, the Acorn executive with overall responsibility for the research and development of the Electron, has been awarded the computer industry's equivalent of an Oscar.

The joint managing director of Acorn was recently named as winner of this year's RITA (Recognition of Information Technology Achievements) award as personality of the year.

However, just like so many of the Hollywood Oscar winners in recent years, he was unable to attend the presentation ceremony in Birmingham as he is currently in Japan on company business.

Hermann Hauser

So his wife Pamela ascended the rostrum to receive the trophy on his behalf from Ian McNaught Davis, the television personality who fronts the "Making the Most of Your Micro" TV series.

Hermann Hauser holds a doctorate in physics from Cambridge where he attended the prestigious Cavendish Physics Laboratory.

It was while he was involved in post doctorate studies that he met Chris Curry, his fellow joint managing director.

As a result they eventually formed Acorn in December, 1978.

Five super shows

MORE than a quarter of a million people are expected to attend a series of shows devoted to the Electron and BBC Micro this year.

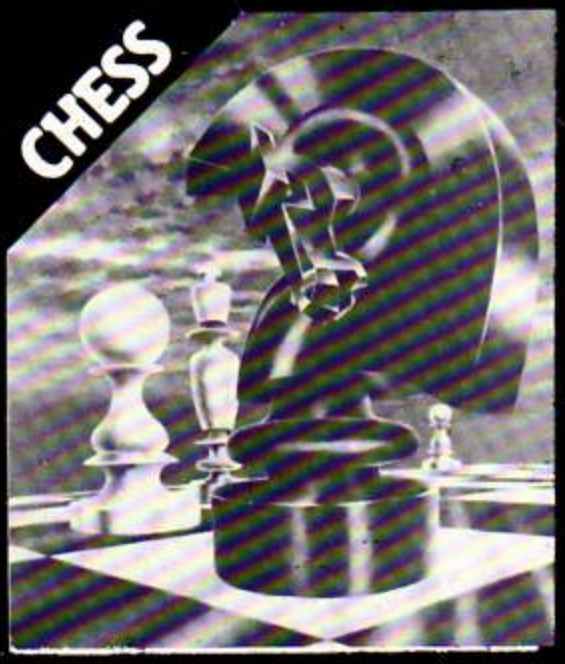
Four of them are being held in London and one in Manchester.

The Electron and BBC Micro User Shows are jointly sponsored by *Electron User* and our sister publication, *The Micro User*.

The London shows are to take place from March 29 to April 1 at

→

SOFTWARE FOR THE ELECTRON



CHESS

Excellent use of the high-res graphics help to make this the most flexible chess game available. A choice of hundreds of different skill levels control the playing strength. This game has been continually updated over the past few years and this later version incorporates a host of new facilities, including the ability to: change the board and piece colours; replay a game, move by move; change levels whilst playing; ask the computer to suggest a move; force the computer to make a move at any time; save a game on tape or disc; blitz play within a time limit; mate in 2, 3 or 4 moves; castle and en passant.

£8·95 incl.

LOGO 2

One of our most popular programs to date. This is not a game, but an introduction to the LOGO graphics language that has become so popular in schools. It incorporates the 'turtle' graphics and many other features common to all LOGOS. Fascinating patterns or other graphics work can be built up very easily using the set of inbuilt commands. The command set can be extended by adding new 'words' to its vocabulary based on the existing set. Logo 2 can be used as a very simple graphics aid for young children, but it can incorporate more advanced ideas — defined procedures, sub-routines, loops and even recursive programming. Supplied with full documentation.

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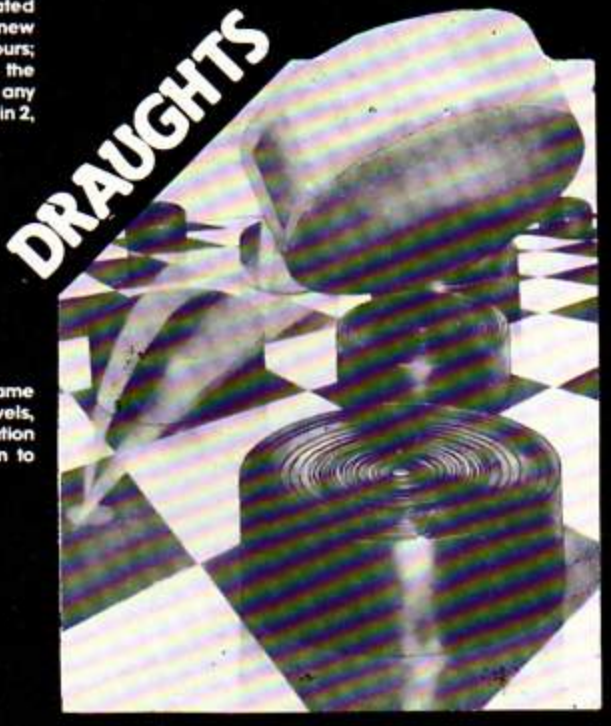

DRAUGHTS

From the same author as our best selling Chess program, this game incorporates many of the features of that program — various skill levels, save a game to tape, replay a stored game, etc. etc. A high resolution colour display (the user may change the colours) and an option to choose the rules of play make this game extremely flexible.
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Software's flooding in

ELECTRON software is coming in thick and fast. All over the country software firms are taking the opportunity to enter the new market that has been opened up by the new machine.

The leaders at present appear to be Micro Power of Leeds, now busily converting BBC Micro programs to run on the Electron.

The firm has 13 Electron titles in the shops and more are on their way.

"It's not just rehashing an old product", said a Micro Power spokesman. "We've taken the chance to improve the games where ever possible".

Meanwhile across the Pennines in Rochdale A&F software is bringing out more Electron titles to join the acclaimed Cylon Attack and Pharoahs Tomb.

Kamakazi, Horror Castle and Chuckie Egg are being added to its growing range of Electron products.

At present two major high street retail chains are negotiating with A&F to distribute their products.

"The demand is phenomenal", said a spokesman, "especially when you realise that there still aren't all that many Electrons about".

Still in the North, the Blackpool firm IJK has just launched three games for the Electron while Leeds-based Dynabyte has brought out two games and a utilities package.

Moving South, Dimax of Northampton has produced a tape containing 10 educational games, and Salamander of Brighton has released a graphics system for the Electron.

"It's amazing", said a leading dealer. "A couple of months ago we were scraping round for Electron software and now there's so much we can't keep track".

Meanwhile Acornsoft is translating the best of its BBC Micro arcade games to the Electron.

"We hope to convert as many BBC titles as possible", said a spokesman.

"Also future releases of software will be in both BBC and Electron forms as far as this is possible".

US release next year?

PLANS are under way to release the Electron in the USA within the next 12 months.

Following the initial success of the BBC Micro in the US educational markets, Acorn intends to send its "little brother" to join it.

There will be differences in the US version of the Electron, mostly because the Americans use a television system which has a different way of handling colour.

Also there are fewer lines on the screen, which means that the US Electron will have slightly altered modes. This will give fewer lines on the screen in any mode.

The gain is that each mode uses less memory, leaving more for the programs.

Machine code manuals

TWO books that aim to help readers make the most of the Electron's built-in assembler are being released this spring.

From Granada comes Ian Sinclair's "Electron Machine Code for Beginners".

Aimed at the complete beginner, it assumes nothing more than a reasonable knowledge of Basic. The second is "Electron Assembly Language" by Bruce Smith from Shiva.

This also is aimed at the beginner and covers the Electron's registers, absolute and indirect addressing, the stack and how to use the operating system routines.

Top shows planned

From Page 7

the Westminster Exhibition Centre; July 19 to 22 at Alexandra Palace; October 25 to 28, also at Alexandra Palace; and from December 6 to 9 again at the Westminster Exhibition Centre.

UMIST in Manchester is to host the single show outside the capital from August 31 to September 2.

"We are well aware of the fact that this is the most ambitious project ever to be undertaken by the organisers of computer shows", says Derek Meakin, Joint Managing Director of Database Publications.

"But let us not forget that we exist in a rapidly changing market. As a result, we will be able to unveil a batch of new and exciting products at each of the shows.

"The London shows are to be held at intervals of around three month – and three months is a long time in the computer marketplace".

MR win Electron add-ons race

THE race to produce the first hardware add-ons for the Electron has been won by a firm from north of the border.

Micro Research of West Lothian started selling their Cloud "black box" in early January, pipping their rivals at the post.

As reported in last month's *Electron User* the Cloud contains a Centronics printer interface, an A/D converter and joystick ports.

At first the sales are by mail order only but MRL hopes to start selling through selected retail outlets in the near future.

Meanwhile late January saw the arrival of the long-awaited Sir Computers range of Electron peripherals.

As expected, the first two products are the 12 ROM board and the printer and joysticks interface.

The arrival of the ROM board is particularly exciting, hugely increasing the scope of the Electron.

The Cardiff firm has other plans for expanding the Electron, but at present these are being kept under wraps.

Not to be outdone by the Scots and the Welsh, an English firm has brought out its own Electron add-ons.

Signpoint of London has a joystick interface for the rear expansion connector.

It has also produced the Myriad, an Electron interface adaptor which gives four copies of the rear connector, allowing more peripherals to be added.

In addition the Myriad has its own external power supply connector, useful when hanging a lot of add-ons to the Electron.

Back at Acorn, the news is that the first official expansion module for the Electron will be available shortly after Easter.

The module comprises an A/D input (suitable for joysticks), a Centronics printer interface and two sideways ROMs.

The unit, seen as the first of a series of expansion modules, is expected to retail at around £70.

Part Two of PETE BIBBY'S introduction to programming

And now for the next step

HELLO, and welcome to the second of this series of beginners articles. It's nice to have you with me again.

If you read last month's article you may remember that I promised we would start writing programs this month.

Simple programs, even stupid programs, but computer programs nevertheless.

First, though, let's just go through what we did last month as we'll be using the concepts we covered then in the programs we're going to write.

We learned that to "talk" to the Electron we had to speak to it in a language it understood – Basic.

We learnt one Basic word of power, PRINT, and saw how to use it to put messages on the TV screen and to give the answers to simple sums.

For example, we could use:

```
PRINT 2+2
```

to give us the answer to the sum. (Not forgetting to press the Return key to tell the Electron to act on what we've typed in.)

We're not just limited to sums, either. We can do subtractions, multiplications and divisions using PRINT – as typing in the following will show:

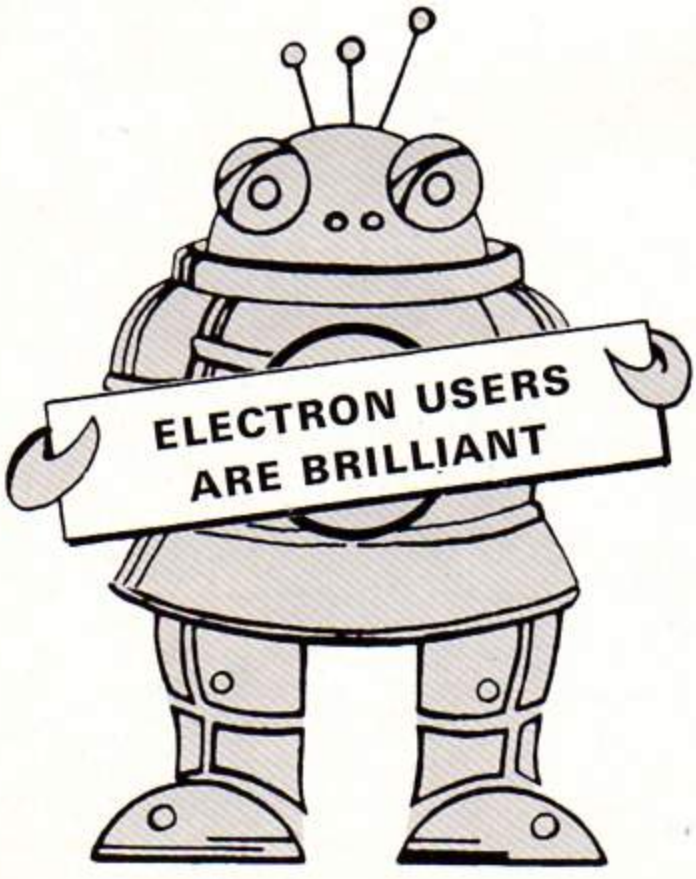
```
PRINT 50-25
PRINT 50*25
PRINT 50/25
```

Notice that special symbols are used for multiplication and division.

PRINT can also be used to print out strings (collections of letters and symbols, treated as one job lot). Type in:

```
PRINT "This is a string"
```

Press the Return key and the message will appear on the TV screen.



At this point I would like to announce that I'm going to stop telling you to press the Return key every time it's needed. Sometimes I'll leave it up to you to remember.

So if you've typed something into your Electron and nothing appears to be happening, try pressing the Return key.

This tells the micro that you've typed in all you want to type in and that it is to obey these instructions.

You'll see from the message we put on the screen that the Electron can tell the difference between capital (or upper case) letters, and small (or lower case) letters. We can have:

```
PRINT "HELLO"
```

or

```
PRINT "Hello"
```

or

```
PRINT "hello"
```

as we choose.

We can't, however, have PRINT in anything but capitals. It's a Basic keyword and for the Electron to recognise it and obey it, it has to be in upper case letters. Try:

```
Print "Hello"
```

or

```
print "Hello"
```

and see what you get.

My advice is, for the time being, keep the Caps Lock on. The yellow light to the left of the keyboard will be shining when this is the case. This way you'll avoid the errors shown above.

Now let's get on with writing programs. You'll have noticed so far that we have been giving the Electron one instruction at a time. We then pressed Return to get it to obey that instruction.

Sometimes, however, we want to give the Electron a series of instructions and then have it carry them out.

Suppose we wanted to have the micro display a message such as:

ELECTRON
USERS
ARE
BRILLIANT

on the TV screen.

Using the step-by-step method we've employed so far we would type in:

```
PRINT "ELECTRON"
PRINT "USERS"
PRINT "ARE"
PRINT "BRILLIANT"
```

pressing the inevitable Return key after every instruction.

Try it out for yourself and you'll see that you don't get the required message.

The problem is that the instructions we've typed in appear on the screen between the messages the micro prints out. This spoils the display.

What we need is a method of getting the micro to print out the messages one after another without stopping for the next instruction. It would:

1. Print out ELECTRON
2. Print out USERS
3. Print out ARE
4. Print out BRILLIANT

in sequence without the instructions showing on the TV screen.

This sequence of instructions, obeyed in order, one after another, is called a computer program. Let's write a program to print out

ELECTRON
USERS
ARE
BRILLIANT

The step by step method wasn't all that wrong as we'll need to use the PRINT command to get the message on the screen.

However, let's try numbering the instructions as we type them in. After all, the micro has to know what order to obey the PRINT commands.

otherwise the message will be jumbled.

First of all though, let's learn about another Basic keyword, NEW.

When you type in NEW and press Return you clear out whatever is in the Electron's memory. If you don't do this before you start typing in a program, it might get jumbled up with any previous programs that you've typed in.

This will become more obvious as you type in more programs. If you like, entering NEW is like wiping a blackboard clean so you can start afresh.

Right, so you've cleared the micro's memory with NEW. Now type in:

```
10 PRINT "ELECTRON"
```

and press Return.

There are two things to notice. First of all the instruction appears to have had no effect on the Electron.

It didn't display ELECTRON on the screen as we might have expected after pressing Return.

This is because we put a number before it. This number is the "line number" of that instruction.

When the Electron comes across a number at the beginning of an instruction it doesn't obey it immediately but stores it away in its memory.

You need another Basic keyword to get the micro to obey the instruction behind the line number.

Until you give it that Basic keyword the line will just stay in memory.

The second thing to notice is that, although the instruction is the first one we want obeyed, we gave it the line number 10 and not 1 as might be expected.

In computing we tend to number our program lines in steps of 10 for reasons that will become clear as you progress.

So far we've got one line of our program in the Electron's memory. Now let's give it the rest of the instructions.

Type in:

```
20 PRINT "USERS"
30 PRINT "ARE"
40 PRINT "BRILLIANT"
```

Don't forget to press the Return key after every line so as to enter it into the micro's memory.

By now the screen should be looking a little untidy so let's clear it by pressing the L key and the CTRL key (you'll find it on the left of the keyboard) at the same time.

Hey Presto! the screen is cleared! But what's happened to the program we typed in? Has that gone as well?

The answer is that the program is still in the micro, hidden in its memory.

All we've done is to clear the screen. The Electron has all the instructions safely stored away, one after another in the order of their line numbers.

To see them we'll use a new Basic keyword, LIST. Type in:

```
LIST
```

and press Return. Your program should appear on the screen. Let's call it, logically, Program I:

```
10 PRINT "ELECTRON"
20 PRINT "USERS"
30 PRINT "ARE"
40 PRINT "BRILLIANT"
```

So, there's your first program. The trouble is that it hasn't done anything yet! It's just sitting there in memory.

Using LIST only shows us what's there. It doesn't get the program to actually do what we want it to.

To get the program going we have to use another Basic keyword, RUN.

This is your big moment. Your're about to run your first program. Type in:

```
RUN
```

and press the Return key to enter it into the micro.

Because there's no line number in front of RUN, the Electron obeys the instruction immediately.

It searches in its memory for the first line number (in this case 10) and obeys the instructions it finds in that line.

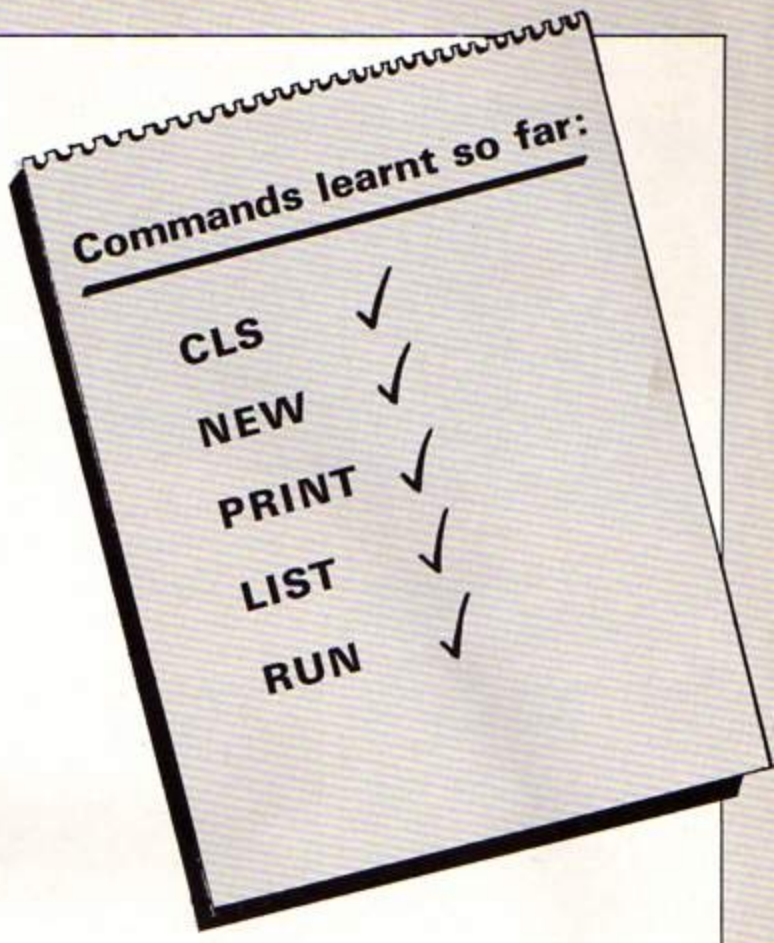
It then goes on to the next line number (in this case 20) and goes on to obey the instructions found in that.

It carries on like this until it runs out of lines to obey.

In other words, RUN makes the micro obey an ordered sequence of instructions.

You don't see all this, however. It all goes on inside the Electron. What you see is:

ELECTRON
USERS
ARE
BRILLIANT



on the TV screen.

If you've managed it, congratulations on running your first program! If you haven't don't worry, just LIST the program again (it's still there, lurking in memory) and see if you've typed in each line correctly.

If one of them is wrong, suppose it's line 30, then just type in the line again as it should be.

The micro will accept this as the new line 30. If you've got it right this time, the program will work when you enter RUN.

Incidentally, if you did make a mistake, you'll probably get an error message that will give you a clue as to what's wrong and which line it's in.

You'll get a lot of these in your computing career. Don't let them worry you, they're there to help you even if they can seem anything but helpful at times!

While we're on the subject of making mistakes, what happens if you're typing a line and you make a mistake half way through? For example:

```
10 PRINT "ELd
```

isn't right. You've typed in a "d" instead of an "E".

Don't worry, if you haven't pressed Return, the line hasn't been entered into the Electron's memory. You can just erase the "d" and put in the right letter.

To do this press the Delete key on the bottom right of the keyboard and the last letter you typed in – in this case the mistaken "d" – will disappear. Then just carry on typing as normal.

If you type in a line and realise halfway through that it's complete gibberish you can get rid of it in two ways.

You can either hold down the Delete key until all the line is erased or, more easily, press the U key and the CTRL key at the same time. Either way gets rid of the line.

Now let's alter our program so that it prints out:

ELECTRON
USERS
ARE
CLEVER

instead of what we had before. It's not difficult at all.

If you think about it all we have to do is to change line 40 to one that prints out CLEVER instead of BRILLIANT.

Type in a new line 40 and the Electron will automatically update the program. Try it now, type in:

```
40 PRINT "CLEVER"
```

and LIST the program which

→

From Page 11

we'll call Program II.

```
10 PRINT "ELECTRON"
20 PRINT "USERS"
30 PRINT "ARE"
40 PRINT "CLEVER"
```

As you can see line 40 has been changed, the rest of the program remaining the same as before.

Now type in RUN, press the Return key and the message will appear on the screen.

So to recap, we have learnt that we can put line numbers in front of our instructions and the Electron will obey them in order when we enter RUN.

This sequence of instructions is called a computer program and if we want to see a listing of a program in memory we type in LIST and press Return.

Also we can correct or alter a line by typing in that line again.

There are other ways of altering program lines without having to go to the trouble of typing the whole line again, but we'll come to these later.

Incidentally, if you want to get rid of a particular line altogether, just type in that line number and press Return. The Electron will delete the whole line.

Suppose we want to get rid of line 40 in Program II. All you have to do is type in:

```
40
```

and press Return. Do it and then LIST the program. You should end up with:

```
10 PRINT "ELECTRON"
20 PRINT "USERS"
30 PRINT "ARE"
```

Enter line 40 again to restore Program II.

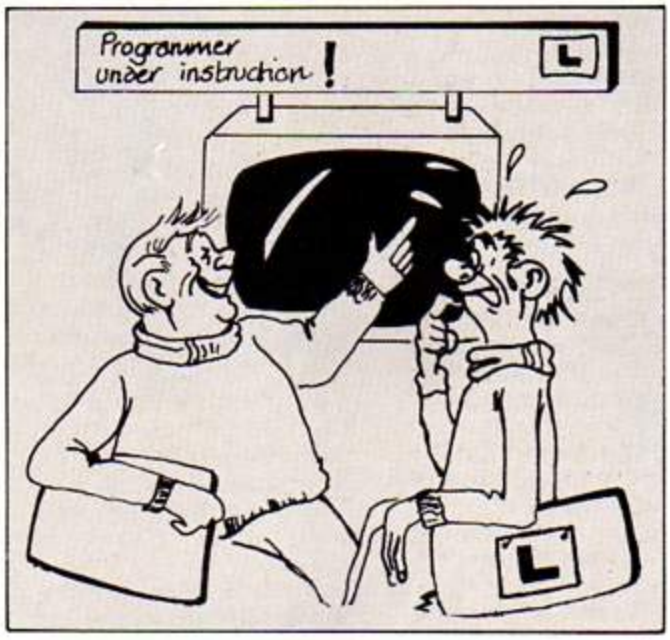
Can you think of how we could alter Program II to give the message

ELECTRON
USERS
ARE
VERY
CLEVER

What we need to do is to have a line in between lines 30 and 40 that adds VERY to the message.

Logically the line number of that instruction will have to be between line 31 and 39.

This means that the Electron will obey the instruction in line 30 to print ARE, then obey the new instruction to print VERY and then obey line 40, printing CLEVER.



Since you're an Electron user and so are very clever, you'll see that what we need is a line such as:

```
35 PRINT "VERY"
```

Of course it could be line number 31, or 39 or any other number that comes between 30 and 40 but 35 is in the middle and leaves us lots of room to add new lines on either side of it.

Now you can see why the line numbers usually go up in tens.

Enter line 35, press Return and then use LIST to see the listing of the program that's now sitting in the Electron's memory.

It should look like:

```
10 PRINT "ELECTRON"
20 PRINT "USERS"
30 PRINT "ARE"
35 PRINT "VERY"
40 PRINT "CLEVER"
```

We'll call this Program III.

You'll see that the Electron has automatically inserted line number 35 into the right place even though we entered it out of order.

Run the program to prove to yourself that it works. Don't just take my word for it, try it all out for yourself.

Right, let's try a different program. Try typing in Program IV:

```
10 CLS
20 PRINT "HELLO"
30 PRINT "OUT"
40 PRINT "THERE"
```

Once you've typed it all in use LIST to get a listing of the program in memory. Is line 35 still there? It shouldn't be, should it?

What's happened is that you didn't use NEW to clear the old Program III out of memory.

Typing in lines 10, 20, 30 and 40 of Program IV overwrote lines 10, 20, 30, and 40 of the old Program III that was still in memory but line 35 stayed put.

If you run the program with line 35 still in place you get an even sillier message than usual!

So the rule is that you should use NEW to clear old programs out of memory before you start typing in new programs. As it is, typing in 35 and pressing Return will get rid of the gatecrashing line.

You may be wondering how line 10 works. What does CLS do? If you run program IV again, you'll see that it clears the screen, then displays the message.

In effect CLS is a Basic command that clears the screen in the same way as pressing the CTRL and L keys at the same time.

Put at the beginning of the program it produces a nice clear screen to display the message on.

And that's it for the time being. We've learnt four new Basic keywords, NEW, CLS, RUN and LIST and made use of the one we knew before, PRINT.

We've also learnt how to type in, modify and amend simple programs. That's quite a lot in one session.

Now I'll leave it up to you to play with your Electron and get some practice in running simple programs putting your own messages on the TV screen.

Remember, even though the programs are simple they illustrate the use of Basic keywords that you will be using all the time in your computing career.

The output may be fairly trivial and, as you'll find out in later articles, there may be easier ways of doing the same things.

But it's the principles that are important.

Programming is a skill and, like any skill, it needs practice to make it perfect.

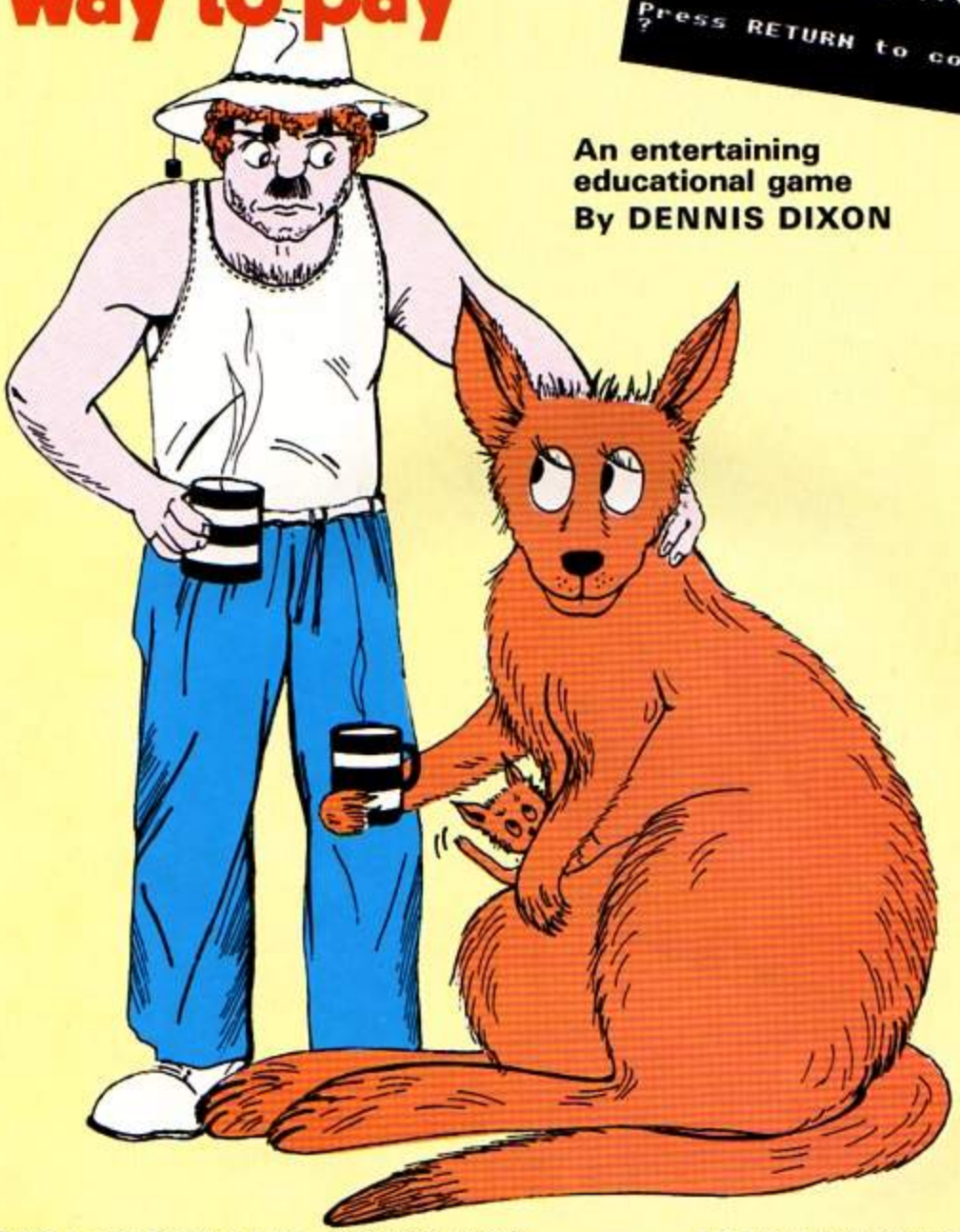
Play around with programs on your micro. You can't hurt it from the keyboard.

You'll soon pick up and master the skills that will make you a minor expert on the Electron in no time at all. Have fun.

'Programming is a skill, it needs practice to make it perfect'

Guess the word – it's the Aussie way to pay

```
Teacher,
This program gives practice with the concept of alphabetical order. It is in the form of a game the rules of which are explained overleaf.
The game may be played with or without the aid of a dictionary, as you choose, but no words of less than three letters will be accepted except at level No.1.
Lower case letters are used throughout, so make sure CAPS LOCK is off (that is, the light is out).
After any response has been made it must be entered by pressing RETURN.
Press RETURN to continue.
?
```



An entertaining educational game
By DENNIS DIXON

THIS month *Electron User* brings to you the Australian Coffee game, an easy to learn, fun to play word game for your micro that will give you hours of fun.

Apparently our friends from Down Under play this game between themselves in cafes to decide who's going to pay for the coffee (or is it how they choose their cricket teams?)

Whatever they use it for, it's certainly compulsive. The Electron "thinks" of a word and you have to guess what the hidden word is.

Not only that, but you have to tell it how many guesses you think that it's going to take you to get the right answer.

After each incorrect guess the micro will tell you whether you are getting any nearer by showing you the two guesses that were closest.

You use your knowledge of the alphabet to home in on the target word.

It's quite educational, as the notes to the teacher that you'll find in the program indicate.

But that doesn't mean it's not enjoyable. In fact it's addictive. Your coffee is likely to go cold while you're playing it!

There are three levels of play and you can easily add your own words if the ones in the program don't satisfy you.

All the instructions are contained in the program, though it doesn't take long to learn the rules of the game.

So type it in and run it. The rest is up to you.

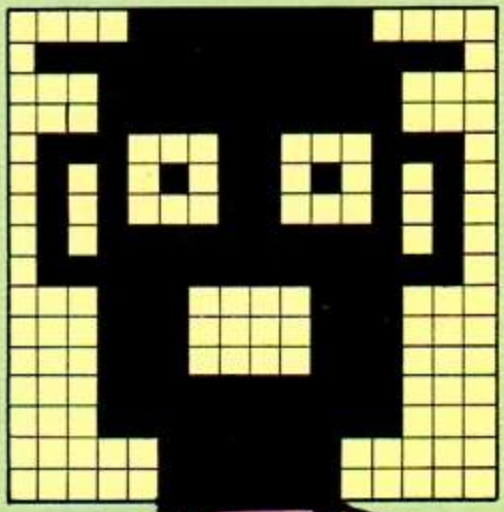
Coffee, anyone?

```
10 MODE 6
20 REM ** Australian Coffee
     Game **
30 REM ** Dennis Dixon
   , Bingham, Notts. **

40 *FX 11,0
50 *FX202,48
60 CLS
   :DIM A$(881)
70 PROCintro
80 IF KK=4
   THEN 190
90 PROCdeal
100 IF KK=1
   THEN A=RND(135)
110 IF KK=2
   THEN A=RND(370)
120 IF KK=3
   THEN A=RND(880)
130 IF KK=2AND A<136
   THEN 110
140 IF KK=3AND A<371
   THEN 120
150 FOR Z=1TO A
160 READ A$(A)
170 NEXT Z
180 RESTORE
190 B$=""
   :D$="a"
   :E$="zzzzzzz"
   :B=0
   :D=0
   :G=0
200 CLS
   :Z$=""
210 PRINT TAB(0,4)STRING$(40
   ,CHR$ (32))
220 PRINT TAB(0,6)STRING$(40
   ,CHR$ (32))
230 PRINT TAB(10,16)CHR$ (151
   );"////////////////////"
240 PRINT TAB(0,4)"Type in
    your guess and RETURN...
```

Turn to Page 56

Casting Agency



THIS month Casting Agency goes live – with three short programs that bring your screen brilliantly to life.

As usual we give you the VDU23 statements so that you can use the characters in your own programs.

In addition to this we're also including the programs as examples of how to make the shapes move.

Watch the helicopter fly across the screen. Can you make it fly backwards or hover? What about the vampire bat, flitting all over the screen?

Could you use the same program for the flying saucer? In fact, can you get the racing car moving round the screen?

Let's see what you can do. And why not send us your own shapes and programs and see yourself in Casting Agency?

Please remember to put your names on your shapes. This month we've got two anonymous contributors. Come on, surely you're not all that shy!

FUNNY FACE

From Peter Hoddinott, Somerset

```
VDU 23,224,15,127,31,31,
113,85,81,95

VDU 23,225,240,254,248,
248,142,170,138,250

VDU 23,226,127,28,29,28,
31,31,7,7

VDU 23,227,254,56,184,56,
248,248,224,224
```

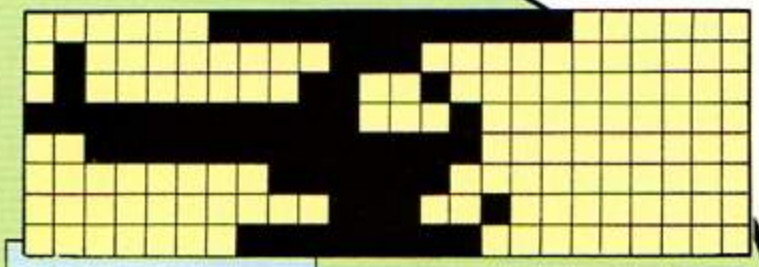
```
  5 REM VAMPIRE BAT
 10 REM SOMEONE FROM
DARLINGTON
 20 REM WHO DIDN'T GIVE A
NAME
 30 MODE 4
 40 VDU23,1,0;0;0;0;
 50 VDU 23,224,0,0,20,42,
    65,65,0,0
 60 VDU23,225,0,0,198,68,
    40,16,0,0
 70 REPEAT
 80 LET xpos=RND(40)-1
 90 LET ypos=RND(23)-1
100 FOR Y=1 TO 10
110 PRINT TAB(xpos,ypos);
    CHR$(224)
120 SOUND &11,-15,
    255-(10*ypos),1
130 FOR X=1 TO 200:NEXT X
140 PRINT TAB(xpos,ypos);
    CHR$(225)
150 FOR X=1 TO 200:NEXT X
160 NEXT Y
170 PRINT TAB(xpos,ypos)" "
180 UNTIL FALSE
```

```
10 REM FUNNY FACE
20 REM FROM PETER HODDINOTT

30 REM SOMERSET
40 MODE 4
50 VDU 23,224,15,127,31
   ,31,113,85,81,95
60 VDU 23,225,240,254,
   248,248,142,170,
   138,250
70 VDU 23,226,127,28,29,
   28,31,31,7,7
80 VDU 23,227,254,56,184,
    56,248,248,224,224
```

```
 90 PRINT TAB(10,14)
    CHR$(224);
    CHR$(225)
100 PRINT TAB(10,15)
    CHR$(226);
    CHR$(227)
```

```
10 REM COPTER SHAPE
20 REM FROM JOHN SPENCE
30 REM DUNSTABLE
40 MODE4
50 PROCcopter
60 PROCmove
70 DEFPROCcopter
80 VDU23,1,0;0;0;0;
90 VDU 23,240,7,96,
   96,255,63,0,0,1
100 VDU23,241,255,56,
    100,226,254,252,
    57,254
110 VDU 23,242,192,0,
    0,0,0,0,0,0
120 copter$ = CHR$(240)
    +CHR$(241)
    +CHR$(242)
130 ENDPROC
140 DEFPROCmove
150 FOR line=2 TO 30
160 FOR row=0 TO 36
170 PRINT TAB(row,line)
    copter$
180 SOUND&10,-15,5,2
190 FOR delay=1 TO 100
    :NEXT delay
200 PRINTT AB(row,line)
    "  "
210 FOR delay=1 TO 50
    :NEXT delay
220 NEXT row
230 NEXT line
240 ENDPROC
```



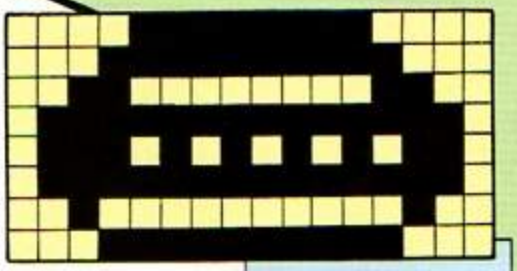
HELICOPTER

From John Spence, Dunstable

```
VDU 23,240,7,96,96,255,
63,0,0,1

VDU23,241,255,56,100,226,
254,252,57,254

VDU 23,242,192,0,0,0,0,
0,0,0
```

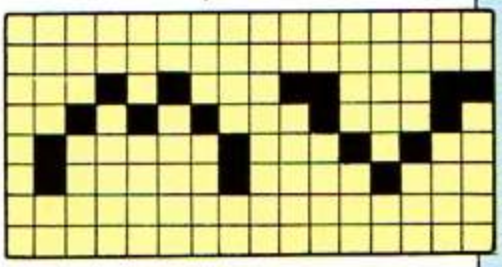


FLYING SAUCER

Anonymous

```
VDU 23,240,15,31,48,
127,117,127,32,31

VDU 23,241,240,248,
12,254,86,254,4,248
```

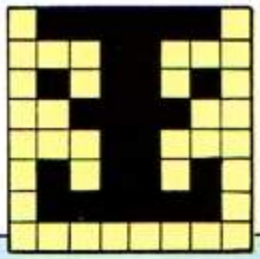


VAMPIRE BAT IN FLIGHT

Anonymous

```
VDU 23,224,0,0,20,42,
65,65,0,0

VDU23,225,0,0,198,68,
40,16,0,0
```



RACING CAR

From Dominic Edmonds, Warwick

```
VDU 23,224,126,24,90,
60,24,90,126,0
```

HAVE you a favourite character you would like to see in this monthly feature in Electron User? Send your drawing of the character, together with the VDU23 statement, to: Shape Dictionary, Electron User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

A joint presentation by The Micro User & Electron User

Don't miss the great new for the Electron

Here's your big chance to catch up on all that's been happening recently in the fast-developing world of the Electron and BBC Micro. And there's so much new to excite and intrigue you . . .

NEW programs from the fertile minds of Britain's leading software writers – games galore, plus a growing number of new packages for teachers and for industrial and business users.

NEW hardware add-ons that expand even more the power and versatility of your micro.

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This voucher is worth £1 per person off the normal admission price of £3 (adults) and £2 (children)
(Valid for a maximum of 4 people)

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10am - 6pm, Thursday, 29 March
10am - 6pm, Friday, 30 March
10am - 6pm, Saturday, 31 March
10am - 4pm, Sunday, 1 April

New Horticultural Hall
Greycoat Street, London SW1

School and College Groups

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Electron & BBC Micro User Show
68 Chester Road, Hazel Grove
Stockport SK7 5NY
Tel: 061-456 8383

Spring show of all that's and BBC Micro

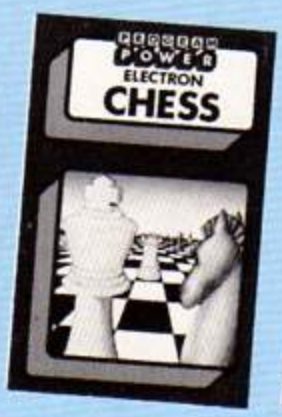
ELECTRON & BBC MICRO USER SHOW

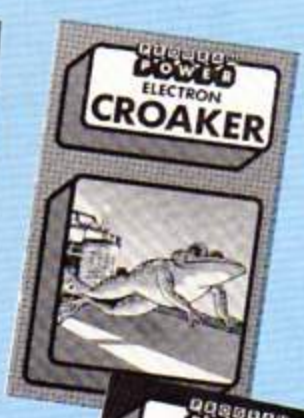
New Horticultural Hall

(Westminster Exhibition Centre)

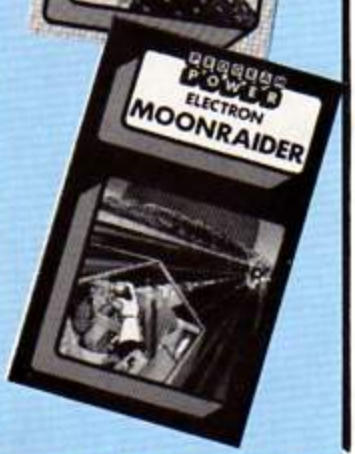
Thursday to Sunday, March 29 to April 1

SUPER FREE CONTEST





Win 10 top software packs!



SO you think you know all about the Electron, do you? Well put your skill and knowledge to the test in our latest free competition, Spot the Error.

No, we don't mean in the magazine, we mean the deliberate errors in the list of variable names below:

```
1 LET new value=45
2 LET PRINTER=3
3 LET total=234
4 LET one+two=27
5 LET compchoice=5
6 LET isn't=-1
7 LET good-guys=4
8 LET 1st=-19
9 LET one$="fred"
```

Some are right, some are wrong. But which is which? Decide for yourself and put ticks or crosses as appropriate in the numbered boxes on the coupon.

Then complete the sentence that begins "I'm an Electron User because . . ." in not more than 20 words – the most amusing correct answer will win.

What's the prize? No fewer than 10 pieces of software from Program Power who are rapidly establishing themselves as leaders in the world of Electron software.

These range from classics such as Croaker and Swoop, to the adventures of Felix and the Logo-based program, Draw.

They're all written to the high standard we've come to expect from this company and are guaranteed to delight, amuse and, occasionally, frustrate you.

The closing date is March 28, and the judge's decision is final.

ELECTRON USER CONTEST

Put your ticks or crosses in these boxes:

1	2	3
4	5	6
7	8	9

I'm an Electron user because . . .
(not more than 20 words).

_____

_____

_____

Name _____ Address _____

_____

Post to: Electron User Contest, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

Outguess the Electron

By PETE BIBBY

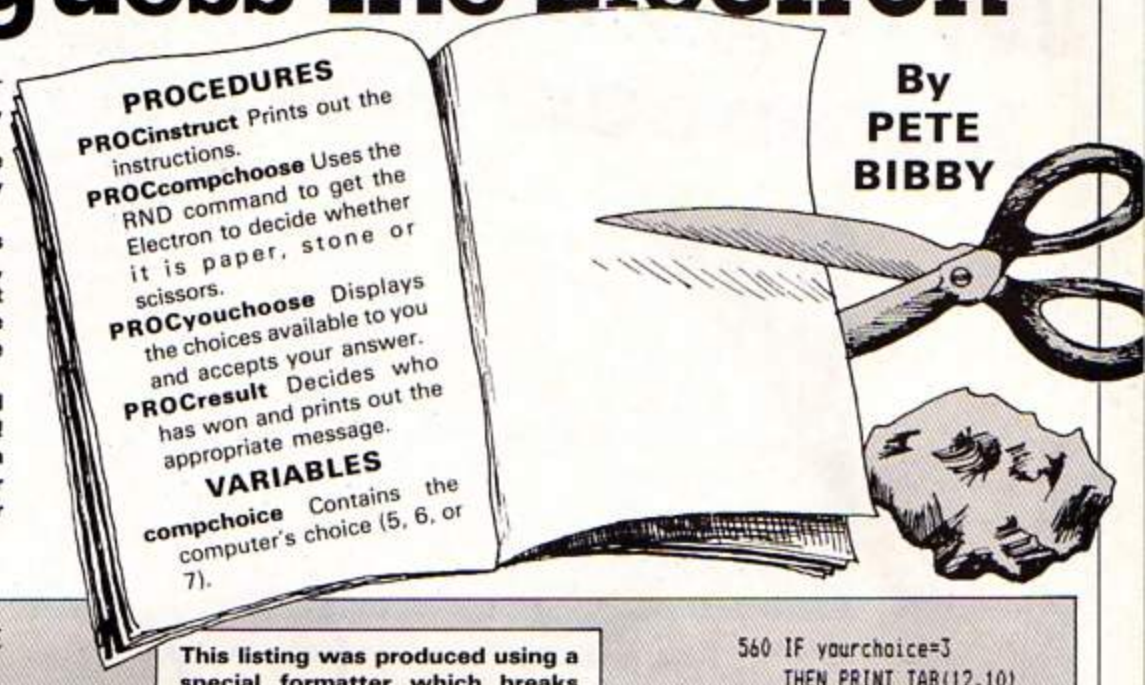
HERE's the Electron version of an old game – paper, scissors, stone.

Can you outguess the Electron? Type it in and try your luck.

And if you want to mess around with the program, why not make it print out shapes to represent the paper, the scissors and the stone?

You could even send them in to Casting Agency!

But first try the program as it is. Who's the better guesser – you or your Electron?



This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter is given on Page 4 of the February issue.

```
 10 REM PAPER,SCISSORS,STONE
 20 REM (C) ELECTRON USER
 30 MODE 2
 40 VDU 23,1,0;0;0;0;
 50 PROCinstruct
 60 REPEAT
 70 PROCcompchoose
 80 PROCyouchoose
 90 PROCresult
100 WAIT$=GET$
110 CLS
120 UNTIL FALSE
130 END
140 DEF PROCinstruct
145 COLOUR 3
    :COLOUR 132
    :CLS
150 PRINT TAB(0,2)"PAPER,SCIS
    SORS,STONE"
160 PRINT TAB(0,3)"**********
    **********"
170 PRINT TAB(1,5)"Here's
     the Electron "
180 PRINT TAB(1,7)"version
     of the old "
190 PRINT TAB(1,9) "game."
200 PRINT TAB(1,11) "First
     of all the "
210 PRINT TAB(1,13) "computer
     picks what"
220 PRINT TAB(1,15) "it will
     be.Then you"
230 PRINT TAB(1,17) "choose.T
    he Electron"
240 PRINT TAB(1,19) "will
     tell you who's"
250 PRINT TAB(1,21) "won.Reme
    mber:"
260 PRINT TAB(1,23) "PAPER
     wraps STONE"
270 PRINT TAB(1,25) "SCISSORS
     cut PAPER"
280 PRINT TAB(1,27) "STONE
     blunts "
290 PRINT TAB(11,29) "SCISSOR
    S"
300 PRINT TAB(3,31) "PRESS
     ANY KEY"
310 WAIT$=GET$
320 CLS
330 ENDPROC
340 DEF PROCcompchoose
350 compchoice=4+RND(3)

360 ENDPROC
370 DEF PROCyouchoose
375 COLOUR 1
    :COLOUR 130
    :CLS
380 PRINT TAB(2,5) "You can
     be:"
390 PRINT TAB(5,10) "1. Paper
    "
400 PRINT TAB(5,15) "2. Sciss
    ors"
410 PRINT TAB(5,20) "3. Stone
    "
420 PRINT TAB(2,25) "Enter
     your choice"
430 yourchoice=GET
440 yourchoice=yourchoice-48
450 IF yourchoice <1
    OR yourchoice >3
    THEN GOTO 430
455 CLS
460 ENDPROC
470 DEF PROCresult
480 COLOUR 0
    :COLOUR 134
    :CLS
490 PRINT TAB(2,5) "ELECTRON"
    TAB(12,5) "PLAYER"
500 PRINT TAB(2,6) "********"
    TAB(12,6) "******"
510 IF compchoice=5
    THEN PRINT TAB(2,10)
    "PAPER"
520 IF compchoice=6
    THEN PRINT TAB(2,10)
     "SCISSORS"
530 IF compchoice=7
    THEN PRINT TAB(2,10)
     "STONE"
540 IF yourchoice=1
    THEN PRINT TAB(12,10)
     "PAPER"
550 IF yourchoice=2
    THEN PRINT TAB(12,10)
     "SCISSORS"
560 IF yourchoice=3
    THEN PRINT TAB(12,10)
     "STONE"
570 FOR delay=1 TO 1000
    :NEXT delay
580 CLS
590 result=compchoice*yourcho
    ice
600 IF result=5 OR result=12
     OR result=21
    THEN PRINT TAB(6,15)
     "A DRAW!"
    :VDU 7
610 IF result=10 OR result=18
     OR result=7
    THEN PRINT TAB(6,15)
     "YOU WIN"
    :ENVELOPE 2,2,6,0,0
    ,255,0,0,126,0,0,-126
    ,126,126
    :SOUND &11,2,4,15
620 IF result=6 OR result=14
     OR result=15
    THEN PRINT TAB(6,15)
     "I WIN"
    :ENVELOPE 3,4,90,-15
    ,-15,10,20,20,126,0
    ,0,-126,126,126
    :SOUND 1,3,100,20
630 FOR delay=1 TO 1500
    :NEXT delay
640 PRINT TAB(4,31) "PRESS
     ANY KEY"
650 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 45.

Notebook Part 2

DRAW is a short program that uses your Electron to fill the screen with coloured lines, over and over again.

There are only 17 lines of program, two of which do nothing. So type it in, run it and try to understand how your Electron is doing it.

REM statements

```
10 REM RANDOM DRAW
20 REM (C) ELECTRON USER
30 REPEAT
40 MODE 5
50 VDU 19,1,RND(7),0,0,0
60 VDU 19,2,RND(7),0,0,0
70 VDU 19,3,RND(7),0,0,0
80 count=0
90 REPEAT
100 count=count+1
110 MOVE 0,0
120 x=RND(1279)
130 y=RND(1023)
140 GCOL0,RND(3)
150 DRAW x,y
160 UNTIL count>100
170 UNTIL FALSE
```

REPEAT...UNTIL loop, runs over and over

"nested" REPEAT...UNTIL loop. This cycles until count is over 100

Try adding any or all of the following lines:

```
155 MOVE 1279,0 : DRAW x,y
156 MOVE 1279,1023:DRAW x,y
157 MOVE 0,1023 : DRAW x,y
```

Quick on the DRAW

Line No:	Description
10-20	REM statements that give information to humans but are ignored by the Electron.
30, 170	These lines put the whole of the working part of the program in an endless REPEAT . . . UNTIL loop.
40	This selects Mode 5 and also clears the screen each time round the loop.
50-70	These pick the three colours which the Electron is going to use to draw the lines. VDU 19 actually chooses which colour is used from a possible selection of 16 (though here the RND(7) restricts the choice to only seven colours).
80	This sets the variable **count** to zero.
90, 160	These two lines set up another REPEAT . . . UNTIL loop. Each time the Electron goes through this loop **count** is increased by one. When it is equal to one hundred, that loop finishes and the Electron goes on to line 170.
100	This line increases the value of **count,** initially zero, by one each time through the loop.
110	MOVES the graphics cursor back to the origin. This means each line will start at the bottom left hand side of the screen.
120, 130	RND is used to pick random values of the x and y coordinates which mark the end of the line.
140	GCOL uses the RND(3) to pick which one of the three colours selected by lines 50,60,70 is to be used to draw the line.
150	This actually DRAWS the line.

Notice that the REPEAT . . . UNTIL loop between lines 90 and 160 is entirely contained within the REPEAT . . . UNTIL loop formed by lines 30 and 170. This is what is known as a "nested loop".

Trevor Roberts

Software Surgery

THE COLUMN THAT TAKES A LOOK INSIDE THE LATEST RELEASES

Great change from zapping aliens

SUPERGOLF
Squirrel Software

On the first hole with Supergolf

I'VE never played golf in my life. My only memory of playing anything like it was taking on my dad on the putting green at Gynn Square, Blackpool more years ago than I care to remember.

So you can see that I'm not really all that well qualified to judge how realistic Supergolf, from Squirrel Software, is. I do, however, know a good game when I see one, and Supergolf is just that.

What you get for your money is a gentle and amusing simulation of a golf course, with all 18 holes and the usual hazards such as bunkers, ponds and the wind.

When you load the game the first thing you get is a list of instructions. These are a model of simplicity, but be warned – you can't get back to the instruction page from the main program.

I advise taking notes the first time you run the game, though you'll soon pick up how to play it.

After the instructions page comes the game proper.

The Electron displays one fairway at a time, viewing the course from the side.

It then asks you to select which club you want and what strength shot you are going to use.

At first it's all a matter of trial and error. Do you use a nine iron or the wedge? Do you hit the ball with a force of 99 or a more moderate 30?

Soon, however, you learn the uses of all the clubs and are quite happily knocking the ball all over the place.

And in my case it really is all over the place! I don't know why it is, but my ball seemed to have a morbid fascination with every bunker on the course.

Happily I'd chosen the one player version of the game so when I displayed my score card at the end of each round I was the only person I embarrassed.

The game was fun, entertaining and engrossing. I may never play golf but I'll certainly be playing Supergolf again. It makes a great change from zapping aliens, even if I'm not very good at it.

Mind you, I do have an excuse for my poor performance. I was feeling under par at the time.

Nigel Peters

Starving for a game

PHARAOHS TOMB
A&F Software

I'M not much of an adventure game freak, having spent too many hours lost on the London Underground for caverns to hold much fascination.

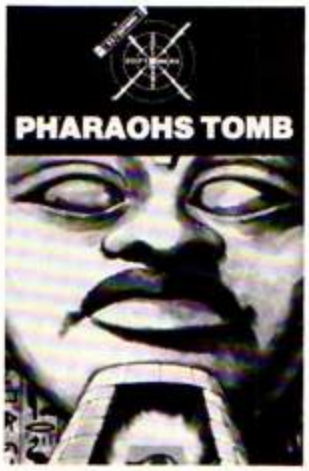
So it was with a distinct air of foreboding that I decided to have a go at Pharoahs Tomb, the "adventure style game" from A&F.

I was entranced from the first moment.

The game isn't really a true adventure. It's more a cross between a series of anagrams, mastermind type puzzles and an arcade action game.

A race against the clock is thrown in as well.

The idea is that you enter



the Pharoah's tomb in order to get hold of his mask and 500 pieces of gold.

When you've got them you can return to the start (if you can find your way) and escape.

At least that's what the instructions say, I must admit that I haven't got that far. I usually starve to death.

On your way through the tomb you are attacked by spiders and mummies, have to solve riddles to open doors, and rush around collecting silver and gold coins.

With the coins you can buy useful items like lances, swords and bows and arrows as well as food.

Sadly, you can't bribe anyone to tell you how to get out.

I could tell you more about the game, but why should I give away my hard won secrets? Find out for yourself!

It's great fun. The instructions are straightforward, though the game seldom is.

It's the type of program that has people looking over your shoulder giving "helpful" hints. If you are tired of all-action games but are a bit wary of a full blown adventure, then Pharoahs Tomb may just meet your needs.

And if you do manage to escape, let me know how.

Trevor Roberts

Power packed chess program

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Program Power

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How Program Power man-

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From Page 21

aged to do so as well as this is truly remarkable. It is a version I found totally absorbing, and one which I most certainly recommend.

On loading, which was straightforward and presented no difficulty, a menu of options is presented.

Each option is most carefully explained on the cassette inlay, and they enable one to set the parameters for any chosen game.

The colours of the pieces and/or the board are easily changed to any combination, so invisible chess becomes possible – and very difficult!

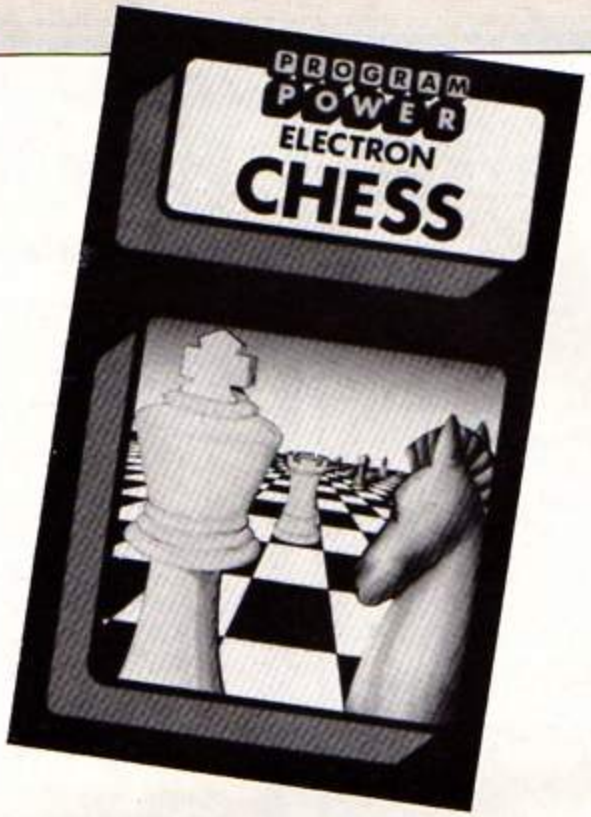
The most obvious choice from the menu is Play, but even then various other decisions have to be made.

It is possible to play against the Electron, to have the computer play itself, or to use the micro simply as a medium through which two human opponents may do battle.

There are several skill levels, although one obviously has to trade power against speed of response.

Average times are given for various levels, with the ninth grade taking about three hours per move.

At my standard of chess that would rival watching the proverbial paint dry.



At lower levels the computer still plays a decent game. It inclines to be orthodox in style, although it enjoys forays with the Queen.

One very helpful feature is the chance to retract a bad move. In fact, by clever use of the built-in facilities, it is even possible to swap sides mid-game.

It is also possible to set up any required board layout to allow analysis of various ideas.

I found these powerful options to be a most useful aid with my 10-year-old chess club members at school.

My favourite choice of play was Blitz Chess, in which one is given only a limited time to make a move. This time can be set as low as 10 seconds, which certainly stimulates the adrenalin.

If no move is made in time the computer claims another go. Here the computer has a great advantage, being troubled with neither fatigue or panic, nor by the telephone ringing.

Obviously any such complex program is almost certain to include the odd bug, and this is no exception.

When playing Blitz Chess, as explained before, the turn reverts to the computer if no move is made within the time allowed.

In one case I was in check but made no move within the limit. The computer promptly took my king and told me I was still in check!

In another game, with the micro playing itself, play reached a state where the board alternated between two positions.

This continued for over a quarter of an hour, with the same yoyo moves, until I put an end to the pieces' misery.

However, with these few minor problems put to one side, all the features of chess are faithfully reproduced in this version, including castling and en-passant.

Illegal moves are disallowed, as well as a very occasional legal move, and the whole gives the feeling of a well-designed program.

It offers good value at the price, and its range caters from beginner to advanced club player – and probably beyond.

Phil Tayler

Action to test arcade fanatics

YOU are the commander of a squadron of three fast and highly manoeuvreable space attack craft, ordered to raid an alien base on the Moon.

MOONRAIDER
Program Power

The aliens, understandably miffed at this, set up a series of defensive zones, each more difficult than before, which you must negotiate.

The first three screens depict hilly landscapes, thickly populated by radar stations, anti-aircraft batteries and missile silos.

Also dotted about are enemy tankers – vital to your mission, for by hitting them with your bombs you gain a much needed boost to your fuel reserves.

This is necessary to enable you to reach your own tanker, which is sited between stages.

Beware of the space mines that surround your tanker – these aliens don't miss a trick.

Stages two and three have flying bombs and fireballs just to keep things interesting.

Stage four takes you over the highlands, sown with missiles and not an enemy tanker in sight until the very end. If you miss this, it's curtains!

Refuel once more and you're through to the final obstacle – a long winding cavern with sharp bends and vertical shafts.

No problem with fuel here, because flocks of enemy tankers block your path. Having said that, none but the very skilled will make it through the cavern.

The enemy base lies tantalisingly beyond, though some may never see it.

Good graphics, a limitless supply of laser bolts, bombs and poachable fuel make this a satisfying and compulsive game.

Skillful use of the faster/slower key makes evasive action easier.

Use of this key while refuelling means that you can take on more fuel, and its use is vital while flying through the caverns.

One of the nice features of the program is you can skip stages by selecting games one to five and set the difficulty by selecting A to D.

A good value game, crammed with action and needing skill to test the most ardent arcade fanatic. A recommended version of the old classic.

Adam Young

ELECTRON USERS!

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And, of course, most of the many programs featured in The Micro User can be easily modified for the Electron.

All in all, if you're an Electron User, it makes sense to also buy The Micro User.

The March issue is now on sale at your newsagents.

BOOKSHELF

Brainteasers for the BBC and Electron Computers, Genevieve Ludinski, Phoenix Publishing Associates

THE subtitle of Brainteasers for the BBC and Electron Computers is Programs to Puzzle and Amuse, and this just about sums it up.

The book is a collection of 29 program listings, each one an interesting and amusing challenge.

I must admit it made a nice change to come across a collection of games that didn't rely too heavily on my ageing reflexes.

No, there were no hordes of alien nasties whizzing across the screen, just gentle, intriguing challenges.

The program types range from mazes and safe cracking to mathematical sequences and pattern sorting.

I particularly liked the idea of Close Encounters of the Fourth Kind, an intergalactic game of Simon.

With 29 listings to choose from there must be something to satisfy or thwart every taste.

Most of these listings aren't long, which encourages you to type them in.

At first sight they looked a little jumbled and cluttered but I had little difficulty entering them.

Well, no more than usual. And the games were well worth the effort of typing them in.

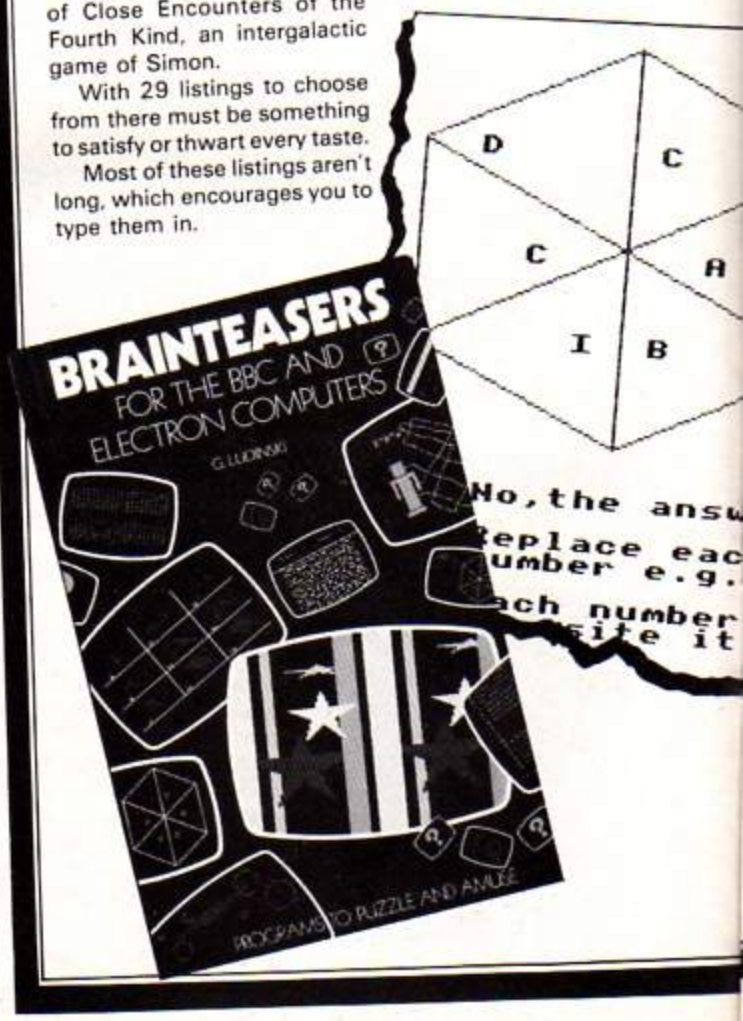
A really nice feature of the book is that each listing has a few paragraphs of program hints before it.

These greatly add to its value, giving explanations of various techniques used in the programs and hints on how to make them easier or more difficult. I'd love to know who wants them to be harder!

There's only one thing that I'd complain about. One of the programs I ran gave me an IQ rating. It must be wrong. I'm far more intelligent than that!

Despite that, it's an enjoyable book, far from the usual run of the mill set of games listings. If you like puzzles and you've got an Electron, then you'll like this book.

Trevor Roberts



Brainteasers listing

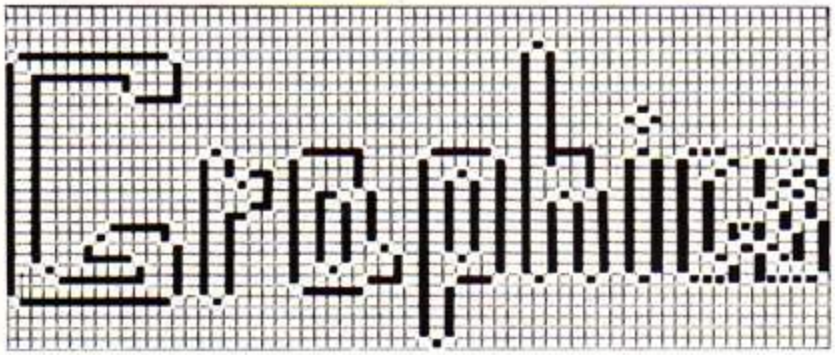
This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter is given on Page 4 of the February issue.

```
  1 REM THIS PROGRAM IS
    FROM
  2 REM BRAINTEASERS FOR
    THE
  3 REM BBC AND ELECTRON
  4 REM COMPUTERS BY
  5 REM G.LUDINSKI
 10 REM HEXAGON PUZZLE
 20 REM COPYRIGHT (C) G.LUDIN
    SKI 1983
 30 MODE 4
 40 DIM S(8),IP$(255)
 50 CLS
 60 VDU 23,224,0,1,2,4,136
    ,80,32,0
 70 TE=0
    :CR=0
    :TIME =0
 80 CLS
 90 TE=TE+1
100 IF TE=11 OR TIME >=
     20000
    THEN GOTO 670
110 REM
120 REM WORK OUT SEQUENCE
130 REM
140 S(1)=0
150 S(2)=INT (RND(1)*9+1)
160 IC=INT (RND(1)*4+1)
170 W=INT (RND(1)*5)
180 FOR I=3 TO 8
190 IF W=0
    THEN S(I)=2*S(I-1)-S(I-2)
    +IC
    :MS$="The interval increa
    ses by "+STR$ (IC)+"
     each time"
200 IF W=1
    THEN S(I)=S(I-1)+S(I-2)+I
    C
    :MS$="Each number is
     the sum of the previous
      two plus "+STR$ (IC)
210 IF W=2
    THEN S(I)=S(2)^(I-1)
    :MS$="Each number is
     "+STR$ (S(2))+" to the
     power of 2,3,4,5,6 and
     7"
220 IF W=3 AND I > 5
    THEN S(3)=S(2)
    :S(4)=IC
    :S(5)=INT ((S(2)+IC)/2)
    :S(I)=S(2)*S(I-3)
    :MS$="Each number is
     "+STR$ (S(2))+" times
     the number       opposit
    e it"
230 IF W=4 AND I > 5
    THEN S(3)=S(2)
    :S(4)=IC
    :S(5)=INT ((S(2)+IC)/2)
    :S(I)=IC*S(11-I)
    :MS$="The numbers on
     the left hand side of
     thewheel are "+STR$ (IC)
    +" times the numbers
     on the    right hand
     side"
240 NEXT I
250 FOR I=1 TO 13
    :PRINT
    :NEXT I
260 REM
270 REM DISPLAY NUMBER WHEEL
280 REM
290 X1=640
    :Y1=704
300 X2=X1+259.81
    :Y2=Y1+150
    :Y3=Y1-150
    :X3=X1-259.81
310 MOVE X1,Y1+300
320 DRAW X2,Y2
330 DRAW X2,Y3
340 DRAW X1,Y1-300
350 DRAW X3,Y3
360 DRAW X3,Y2
370 DRAW X1,Y1+300
380 DRAW X1,Y1-300
390 MOVE X2,Y2
    :DRAW X3,Y3
400 MOVE X2,Y3
    :DRAW X3,Y2
410 IF S(8) > 26
    THEN LE=0
    :PRINT TAB(21,5);S(3)
    :PRINT TAB(23,10);S(4)
    :PRINT TAB(21,14);S(5)
    :PRINT TAB(14,14);S(6)
    :PRINT TAB(12,10);S(7)

420 IF S(8) <= 26
    THEN LE=1
    :PRINT TAB(21,5);
    CHR$ (64+S(3))
    :PRINT TAB(23,10);
    CHR$ (64+S(4))
    :PRINT TAB(21,14);
    CHR$ (64+S(5))
    :PRINT TAB(18,14);
    CHR$ (64+S(6))
    :PRINT TAB(16,10);
    CHR$ (64+S(7))
430 REM
440 REM INPUT ANSWER
450 REM
460 IX=1
470 IP$(IX)=INKEY$ (10)
    :IF IP$(IX)=""
    THEN PRINT TAB(0,1);
    INT (TIME /100)
    :GOTO 470
480 PRINT TAB(IX+13,5);IP$(IX
    );
    :IX=IX+1
    :IP$(IX)=GET$
    :IF IP$(IX) <> CHR$ (13)
     THEN GOTO 480
490 I$=""
    :FOR I=1 TO IX-1
    :I$=I$+IP$(I)
    :NEXT I
500 REM
510 REM CHECK ANSWER
520 REM
530 *FX 15,1
540 IF LE=0 AND ABS (
    VAL (I$) - S(8)) <=
     LEN (I$)/2
    THEN COLOUR 1
    :VDU 8
    :PRINT TAB(19,5);
    CHR$ (224)
    :CR=CR+1
    :COLOUR 3
    :GOTO 610
550 IF LE=1 AND (I$=CHR$ (64+
    S(8)) OR I$=CHR$ (65+S(8)
    ))
    THEN COLOUR 1
    :VDU 8
    :PRINT TAB(19,5);
    CHR$ (224)
    :CR=CR+1
    :COLOUR 3
    :GOTO 610
560 PRINT TAB(0,21);"No,the
    answer = ";
570 IF LE=0
    THEN PRINT S(8)
580 IF LE=1
    THEN PRINT CHR$ (64+S(8))
590 IF LE=1
    THEN PRINT
    :PRINT "Replace each
     letter by its position
         number e.g. 1 for
     A,2 for B etc."
600 PRINT
    :PRINT MS$
610 PRINT TAB(0,30);"Press
     Return to continue"
620 INPUT A$
630 GOTO 80
640 REM
650 REM SCORE SHEET
660 REM
670 CLS
    :PRINT
680 PRINT "Number of puzzles
       completed = ";TE
690 PRINT
    :PRINT "Number correct
     = ";CR
700 PRINT
    :PRINT "Time taken =
     ";INT (TIME /100);"
     seconds"
710 IQ=INT (CR*100/5.3)
720 PRINT
    :PRINT "Your IQ level
     (numeracy) = ";IQ
730 PRINT
740 IF CR >= 7
    THEN PRINT "This is class
    ed as SUPERIOR (upper
     10%)"
    :GOTO 770
750 IF CR = 6
    THEN PRINT "This is class
    ed as GOOD (upper 20%)"
    :GOTO 770
760 IF CR = 5
    THEN PRINT "This is class
    ed as FAIR (upper 60%)"
770 REM
```

THIS game is just one of 29 testing listings that appear in Brainteasers for the BBC and Electron Computers, by Genevieve Ludinski, price £5.95.

Our thanks go to the publishers, Pheonix Publishing Associates, for their permission to use the hexagon puzzle.



COLOUR BY NUMBERS

MICK MACMANUS continues to explore the world of Electron graphics

IN the last article we met the seven different modes that the Electron can use. We talked about the effect selecting each mode has on the screen display and the amount of memory available for our programs. We also covered how many colours could appear on screen at any one time. What we didn't say was how to get these colours.

You'll have noticed that whenever we change mode with:

```
MODE 1
```

or:

```
MODE 5
```

we end up in black and white. In fact, to be technical, we end up with white letters on a black background.

This month we'll be dealing with ways to change the colour of the letters we use and the backgrounds we display them on. We'll be exploring the colour commands that affect the text we print.

The reason why we've only had white text on a black background up until now is that these are the *default* colours of each mode.

All this means is that these are the colours that the text will be printed in unless you do something about it.

If you don't tell the Electron that you want a different colour of letter on some other colour of background, you get white letters on a black background by default.

One idea to grasp firmly is that each letter or character printed by the Electron on the TV screen has a background and a foreground.

Figure I shows this for the letter A. Every text character that we put on the Electron's TV screen consists of a foreground, in the shape of the character printed on a square background.

Up until now we've always had a white foreground colour which has stood out against the black background.

Incidentally, you might notice that the black of the screen isn't just one big black mass but is made up of lots of little black squares, all of them the background to a character. Later, we'll see what this means for our text displays.

Now let's see if we can change the foreground colour. Type in:

```
MODE 5
```

and press the Return key.

The Electron is now in Mode 5 which, as you'll see from Figure II, is a four colour mode.

If you type in a few letters at random, you'll see that at the moment we have the same old white letters against a black background.

These are the default colours, as I told you. However, we're not stuck with these. Mode 5, is a four colour mode so let's explore the other two colours.

Get rid of the line you've been typing in, by pressing CTRL and U at the same time, and enter:

```
COLOUR 1
```

Now see what happens when you type some characters. The background colour is still the same boring black, but the foreground, the bit that makes up the letters, is red. When you get tired of red letters then enter:

```
COLOUR 2
```

and you'll find that you've got yellow letters.

As you can see, Mode 5 (and, incidentally, Mode 1) is a four colour mode and the colours are black, red, yellow and white. We pick the foreground colour of our text using the COLOUR command followed by a number.

It is this number, known formally as the logical colour number, which specifies the colour that is used.

I prefer to call the number the colour code number, because that is all it is, a code number that is attached to a colour.

The code numbers and the colours that they stand for are:

0 black
1 red
2 yellow
3 white

Run Program I to see the effects of the COLOUR command with the different code numbers.

```
 10 REM PROGRAM I
 20 MODE 5
 30 count=0
 40 REPEAT
 50 colour=count MOD 3 +1
 60 COLOUR colour
 70 PRINT
    :PRINT :
 80 PRINT "This is COLOUR
     "; colour
 90 PRINT
    :PRINT :
100 PRINT "PRESS ANY KEY"
110 WAIT$=GET$
120 count=count+1
130 UNTIL FALSE
```

As you see this prints out its message in the three foreground colours available in Mode 5. If you change line 20 to:

```
20 MODE 1
```

you'll see that the same colour codes produce the same colours in Mode 1, the other of the Electron's four colour modes.

Can you guess why the last program didn't bother with the colour code of 0? If you can't, enter:

```
COLOUR 0
```

and see what happens when you type.

Printing a black foreground

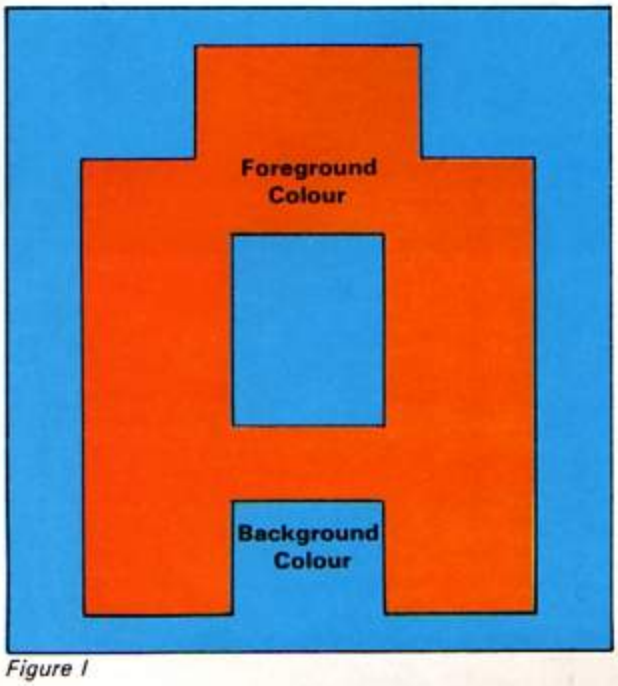


Figure I

on a black background doesn't add to the clarity of a display!

Press Escape and the Electron will take you back to good old black and white.

But you might ask, that's only the foreground. What about the background? Can you change its colour? The answer is you can.

You use the COLOUR command as before. But this time the code for each colour is 128 higher. This gives:

128 black background
129 red background
130 yellow background
131 white background

As you can see, the colour code for the background is the same as the colour code for the foreground PLUS 128.

Let's change the background colour to red with:

```
COLOUR 129
```

This will cause all the characters we now print out to have a red background. Try it and see.

Notice that it is only the background of the characters we print after the COLOUR command that appear red.

Not all of the background goes red at first, only the square backgrounds around the letters.

The original background colour remains the same wherever there is nothing written on it. In this case, since we just pressed Escape, it is black.

This is because the black background we have when we enter a Mode is made up by filling the whole of the screen with spaces.

These spaces are characters that consist of just a square of background colour, with no foreground.

In the normal course of →

MODES 0, 3, 4, 6

Logical number		Colour (on entering mode)
Foreground	Background	
0	128	Black
1	129	White

MODES 1, 5

Logical number		Colour (on entering mode)
Foreground	Background	
0	128	Black
1	129	Red
2	130	Yellow
3	131	White

MODE 2 (and actual colours)

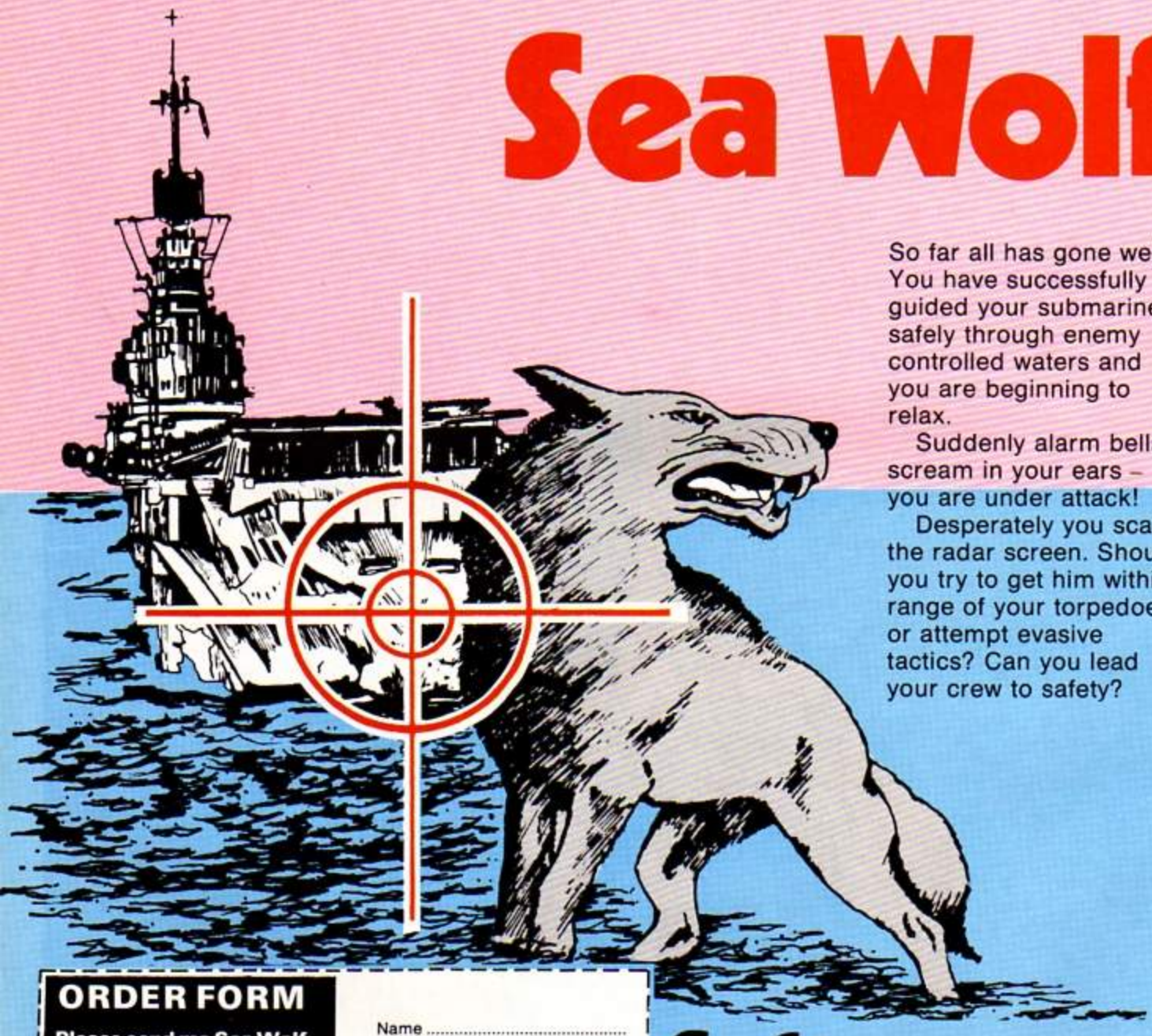
Logical number		Colour (on entering mode)
Foreground	Background	
0	128	Black
1	129	Red
2	130	Green
3	131	Yellow
4	132	Blue
5	133	Magenta
6	134	Cyan
7	135	White
8	136	Flashing black-white
9	137	Flashing red-cyan
10	138	Flashing green-magenta
11	139	Flashing yellow-blue
12	140	Flashing blue-yellow
13	141	Flashing magenta-green
14	142	Flashing cyan-red
15	143	Flashing white-black

N.B. The logical colour numbers on entering mode 2 are also the actual colour numbers.

Figure II

OPTIMA SOFTWARE

Sea Wolf



So far all has gone well. You have successfully guided your submarine safely through enemy controlled waters and you are beginning to relax.

Suddenly alarm bells scream in your ears – you are under attack!

Desperately you scan the radar screen. Should you try to get him within range of your torpedoes, or attempt evasive tactics? Can you lead your crew to safety?

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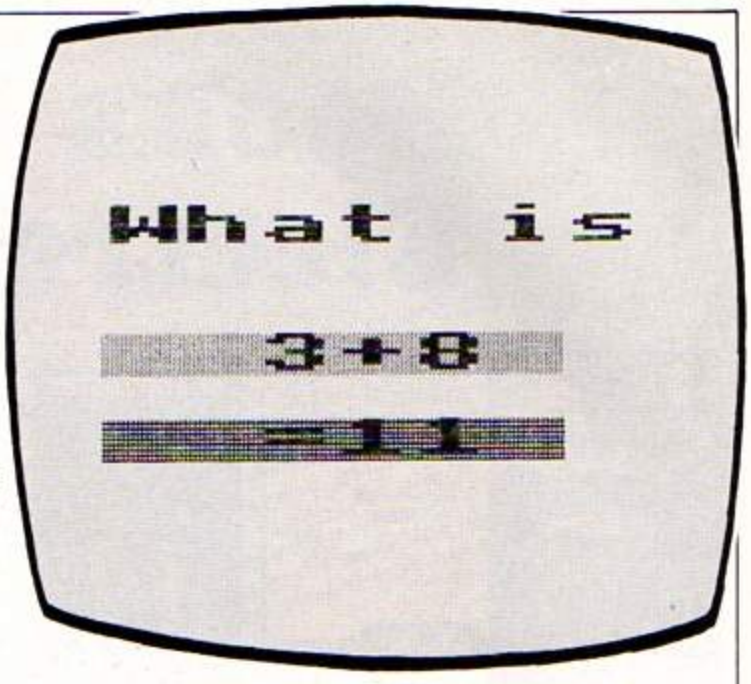

From Page 27

events we write over these squares with our text characters which usually have a black background by default.

This means that the joins between the edges of the characters we've printed and the original black squares that haven't been covered by our text characters don't show.

When we change the background colour to, say, red the joins do show, producing the ragged effect where the old and new background colours clash.

Happily this only lasts until the screen starts scrolling upwards to make room for a new line when it's full. Now all the spaces will be the new background colour.

Alternatively we can clear the screen with CLS and the whole background will go to the new colour.

To see the effects of changing the background colour run Program II. Do you understand why there is the ragged effect at first, but later the background is an even colour?

And why don't I change the background with COLOUR 131?

```
10 REM PROGRAM II
20 MODE 5
30 count=0
40 REPEAT
50 backcolour=count
   MOD 3 +128
60 COLOUR backcolour
70 PRINT
   :PRINT :
80 PRINT "This is background
    COLOUR ";backcolour
90 PRINT
   :PRINT :
100 PRINT "PRESS ANY KEY"
110 WAIT$=GET$
120 count=count+1
130 UNTIL FALSE
```

Try running Programs I and II in Mode 1, the other four colour mode. Of course, you'll have to change line 20 in each program to read MODE 1.

Now let's move on to consider Mode 2, the 16 colour mode. You can change the foreground colour and the background colour in just the same way as before using COLOUR with the appropriate number.

The difference is that now you have 16 logical colours, numbered from 0 to 15.

Run Program III and you'll see the foreground colours available in Mode 2.

```
10 REM PROGRAM III
15 MODE 2
20 FOR x=0 TO 15
25 COLOUR x
40 PRINT "This is colour
    ";x
50 PRINT
60 NEXT x
70 WAIT$=GET$
75 COLOUR 7
80 FOR x=0 TO 15
90 COLOUR 128+x
95 PRINT
100 PRINT "Background ";128+x
120 NEXT x
```

Just press any key and you'll see the background colours as well.

You'll notice that, along with the new colours you get, the colours coded from 8 to 15 are flashing colours. All the codes for the colours are shown in Figure II.

The flashing colours can be very useful for simple animation as we'll see in the next article. As it is, just have fun using the range of colours in Mode 2 to enliven your text.

Now let's go back to Mode 5 for a while. One point to notice is that when you use the COLOUR command colour, only the text or backgrounds printed AFTER the COLOUR command are in the new colour.

The command doesn't change the colour of any of the text that's already been printed. You wouldn't expect it too would you?

Yet some colour commands we'll come across later do have this backwards effect on the colours on the screen. Still, that's for later on.

Program IV is a rather silly program for adding two numbers. I've included it to show how you can have all four colours on the screen at one time, enlivening your display.

```
10 REM PROGRAM IV
20 MODE 5
30 COLOUR 129
   :CLS
40 COLOUR 0
50 PRINT TAB(6,5)"What is"
60 COLOUR 130
70 PRINT TAB(6,8)"
   "
80 PRINT TAB(6,8)"  3+8
   "
90 COLOUR 131
100 PRINT TAB(6,10)"
    "
110 PRINT TAB(6,10)"  =11
    "
120 VDU 23,1,0;0;0;0
```

Line 20 puts the Electron in Mode 5 while line 30 puts the background colour to red (128+1), the CLS flushing the screen to this colour.

Line 40 selects black as the foreground colour of any text we might print and line 50 prints the question.

After the question is printed, line 60 changes the background colour to yellow. Now any text printed will have a yellow background.

Line 70 prints a row of spaces which have the background colour yellow. This produces a nice yellow box in the otherwise red screen.

Line 80 then prints the sum in the same place.

Line 90 picks a white background colour, line 100 prints a white box and line 110 overprints this with the answer.

Line 120 just switches off the flickering cursor.

There you are, four colours on screen, making a nice display.

The more observant of you will realise that you don't need lines 70 and 100 as the following lines completely overwrite them.

However with other programs this might not always be the case, so I put the lines in to show how to put boxes of colour on the screen.

And that about brings things to an end for this month.

We've covered quite a lot and I'd advise you to mess around with different combinations of background and foreground colours in Modes 1, 2 and 5 until you get used to them.

But what about the two colour modes? Are we stuck with the default logical colours, black and white?

No, we're not, but how to change them can wait until my next article.

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Have fun with polygons

IT is said that Michelangelo drew a perfect circle free-hand to gain entry to the local art academy.

With the aid of your Electron you can draw circles which, while not being exactly perfect, will be produced a bit more quickly than his.

This program demonstrates a fast procedure for drawing polygons (many sided figures).

If you include enough sides the polygon begins to look like a circle, so you get two procedures for the price of one.

If you want to include the procedure in your own programs it is to be found in lines 750-900.

The program also illustrates the method of fast animation by pallet spinning. This is in lines 590-740.

A drawing is first made using different logical colours for each line. Then it is brought to life by making one colour white and the rest black.

After a short pause this colour is also swiched to black and the next one in the sequence is made white allowing the next line to appear almost instantaneously.

This creates the illusion of rapid animation.

See if you can add to the program using the polygon procedure to create your own effects.

By MIKE COOK

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter is given on Page 4 of the February issue.

```
10 REM FUN WITH POLYGONS
   BY MIKE COOK
20 THE_SEA_RUNS_DRY=FALSE
30 REPEAT
40 MODE 6
50 PRINT TAB(6,5);"THE
   ELECTRON USER PRESENTS
   "
60 PRINT TAB(0,10);"FUN
   WITH POLYGONS"
70 PRINT "By Mike Cook"
80 PROC_SHOW
90 MODE 0
100 VDU 23,1,0;0;0;0;
110 VDU 19,1,0,0,0,0
120 FOR N%=3 TO 10
130 VDU 19,0,RND(6),0
   ,0,0
140 FOR R%=30 TO 500
   STEP 60
150 PROC_POLY(640,512
   ,R%,N%)
160 NEXT
170 CLS
180 NEXT
190 MODE 2
200 VDU 23,1,0;0;0;0;
210 FOR C%=1 TO 15
220 GCOL 0,15-C%
230 PROC_POLY(640,512
   ,C%*34,C%+2)
240 NEXT
250 PROC_SHOW
260 PROC_SPIN(14)
270 MODE 0
280 VDU 23,1,0;0;0;0;
290 FOR A%=1 TO 3
300 CLS
310 FOR B%=1 TO RND(15)+6
320 PROC_POLY(RND(1280)
   ,RND(1024),RND(400)
   ,RND(10)+2)
330 NEXT
340 PROC_SHOW
350 NEXT
360 MODE 0
370 VDU 23,1,0;0;0;0;
380 FOR X%=40 TO 840
   STEP 25
390 PROC_POLY(X%,512,X%/2
   ,(X%/20)+10)
400 NEXT
410 PROC_SHOW
420 MODE 2
430 VDU 23,1,0;0;0;0;
440 C%=1
450 FOR RA%=10 TO 800
   STEP 12
460 GCOL 0,C%
470 PROC_POLY(640,512
   ,RA%,(RA%/20)+10)
480 C%=(C%+1) AND 15
490 IF C%=0
   THEN C%=1
500 NEXT
510 PROC_SPIN(2)
520 PROC_SHOW
530 UNTIL THE_SEA_RUNS_DRY
540 DEF PROC_SHOW
550 TIME =0
560 REPEAT
570 UNTIL TIME > 500
580 ENDPROC
590 DEF PROC_SPIN(S%)
600 FOR A%=1 TO 15
610 VDU 19,A%,0,0,0,0
620 NEXT
630 TIME =0
640 REPEAT
650 T%=TIME
660 B%=(A%+1) AND 15
670 IF B%=0
   THEN B%=1
680 VDU 19,A%,0,0,0,0
690 VDU 19,B%,7,0,0,0
700 A%=B%
710 REPEAT
720 UNTIL TIME >T%+S%
730 UNTIL TIME > 2000
740 ENDPROC
750 DEF PROC_POLY(X%,Y%
   ,R%,N%)
760 LOCAL LX%,LY%,C,TX%
   ,TY%,C1,S1,A%
770 C=2*PI /N%
780 C1=COS (C)
790 S1=SIN (C)
800 LX%=X%+R%
810 LY%=Y%
820 MOVE LX%,LY%
830 FOR A%=1 TO N%
840 TX%=X%+(LX%-X%)*C1-(LY%
   -Y%)*S1
850 TY%=Y%+(LX%-X%)*S1+(LY%
   -Y%)*C1
860 DRAW TX%,TY%
870 LX%=TX%
880 LY%=TY%
890 NEXT
900 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 45.

SOUNDS.. EXCITING

THIS month Sounds Exciting enters a new field and includes some simple one line programs to produce the noises. Most of these came from Ewan MacLoed of Syewarton, Ayrshire.

Just type them in and run them in the normal way. You'll see (or, rather, hear) that, with a little bit of programming you don't always have to use the ENVELOPE command to produce simple sound effects.

Bird Tweet

```
10 FOR SZ=255 TO 245 STEP -1
:SOUND 17,-15,SZ,1
:NEXT
```

Huge Splash

```
SOUND 0,-15,20,50
```

Shots from a Ray-Gun

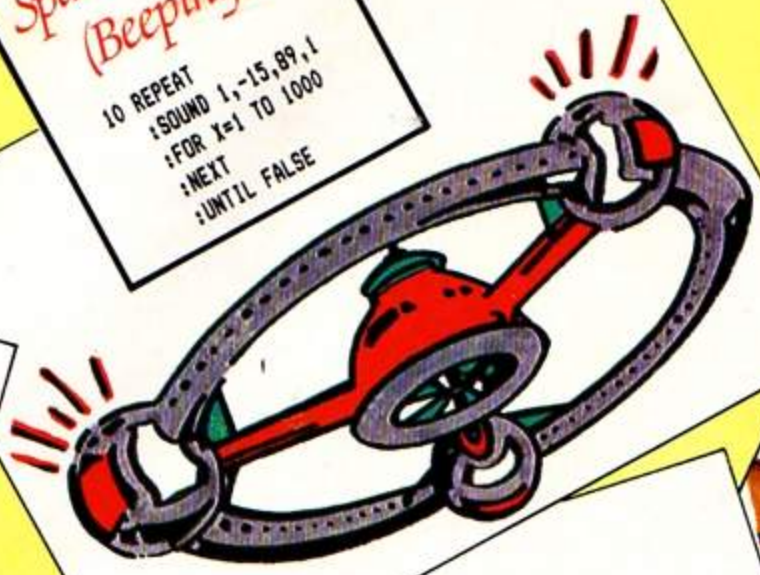
```
10 FOR SZ=1 TO 50
:SOUND 1,-15,89,1
:FOR X=1 TO 100
:NEXT
:NEXT
```

Radiation

```
SOUND 0,-15,255,200
```

Space Satellite (Beeping)

```
10 REPEAT
  :SOUND 1,-15,89,1
  :FOR X=1 TO 1000
  :NEXT
  :UNTIL FALSE
```



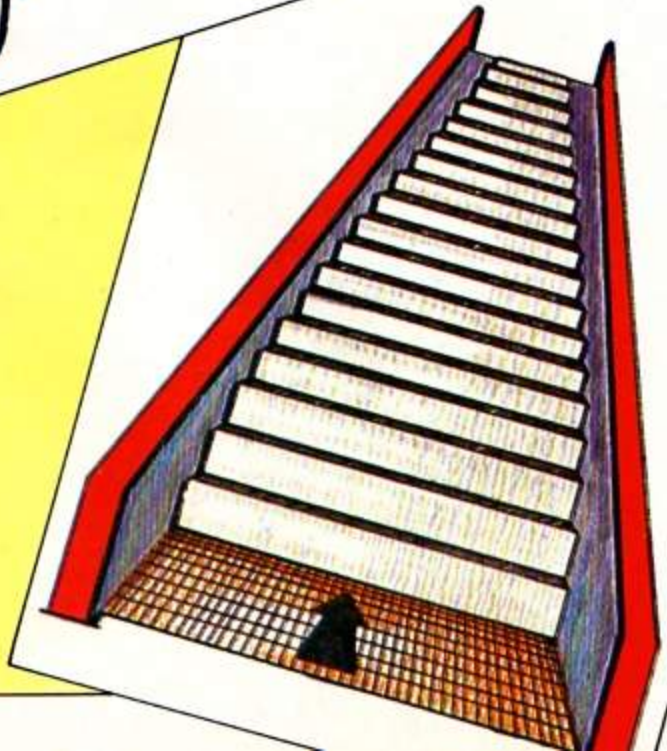
Bird Song

```
10 FOR S%=255 TO 211 STEP-4
  :SOUND 17,-15,S%,1
  :FOR D=1 TO 40
  :NEXT
  :NEXT
```

Escalator

```
ENVELOPE 1,20,24,35,34,34,
23,34,126,0,0,-126,126,126

SOUND 1,1,50,20
```



Do you have any sounds for Sounds Exciting? Send them into Electron User and hear yourself in print. The address: Sounds Exciting, Electron User, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

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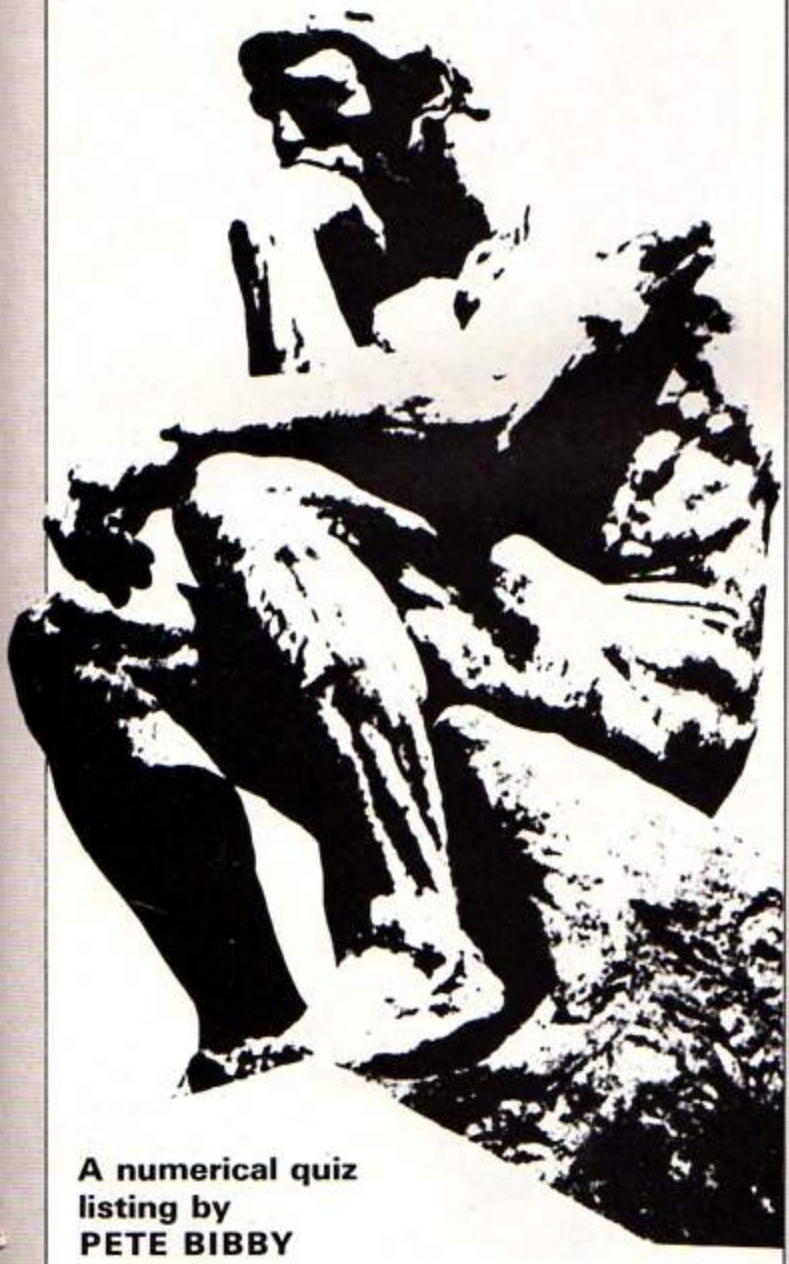

A numerical quiz listing by PETE BIBBY

HOW good are your powers of mental arithmetic? Are you a mathematical genius?

Run Counter and let your Electron test you.

The game is simple to play. The Electron asks you to add together two numbers and tell it the answer.

At first the sums are easy, but things soon get more difficult.

When and if you get 12 right in a row then the sums become easier but the time period gets shorter!

Oh, yes, we forgot to tell you – you're also racing the clock. Good luck!

```
 10 REM COUNTER
 20 REM (C) ELECTRON USER
 30 MODE 6
 40 VDU 19,0,4,0,0,0
 50 VDU 23,1,0;0;0;0
 60 difficulty=1
    :turn=1
 70 CLS
 80 PROCtry
 90 END
100 REM ********************
110 DEF PROCnumber
120 level=turn
130 REPEAT
140 IF level>12
    THEN level=level-12
150 UNTIL level<=12
160 IF level<=12
    THEN number1=RND(9999)
    :number2=RND(9999)
170 IF level<=9
    THEN number1=RND(999)
    :number2=RND(999)
180 IF level<=6
    THEN number1=RND(99)
    :number2=RND(99)
190 IF level<=3
    THEN number1=RND(9)
    :number2=RND(9)
200 ENDPROC
210 REM ********************
220 DEF PROCtry
230 PROCnumber
240 PRINT TAB(3,5)"What
     is the result of"
250 PRINT TAB(28,5);number1
    ;" + ";number2;" ?"
260 PRINT TAB(3,20)"Enter
     the answer and press
     Return"
270 test=INKEY (1000/diffic
    ulty)
280 IF test=-1
    THEN PROClose
    :ENDPROC
290 PRINT TAB(19,23)
    CHR$ (test)
300 INPUT TAB(20,23) rest$
310 attempt$=CHR$ (test)+re
    st$
320 answer=number1+number2
330 IF answer<>VAL (attempt
    $)
    THEN PROClose
    ELSE PROCright
    :ENDPROC
340 ENDPROC
350 REM ********************
    ***********
360 DEF PROClose
370 SOUND 1,-15,4,10
380 CLS
390 IF test=-1
    THEN PRINT TAB(3,5)
     "Time up, you lose!"
    ELSE PRINT TAB(3,5)
     " Wrong, the  answer
     was ";answer
400 PRINT TAB(3,10) "Still,
     you got ";turn-1;
    " right."
410 PRINT TAB(3,15) "Enter
     Y if you'd like anothe
    r go."
420 INPUT TAB(38,15) go$
430 IF go$="y" OR go$=
    "Y"
    THEN CLS
    : turn=1
    : PROCtry
440 ENDPROC
450 REM ********************
460 DEF PROCright
470 PRINT TAB(17,13)"Correc
    t!"
480 ENVELOPE 2,2,6,0,0
    ,255,0,0,126,0,0,-126
    ,126,126
490 SOUND 1,2,4,15
500 FOR N=1 TO 2000
    :NEXT N
    : CLS
510 difficulty =1+ turn
     DIV 12
520 turn=turn+1
530 PROCtry
540 ENDPROC
```

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter is given on Page 4 of the February issue.

This listing is included in this month's cassette tape offer. See order form on Page 45.

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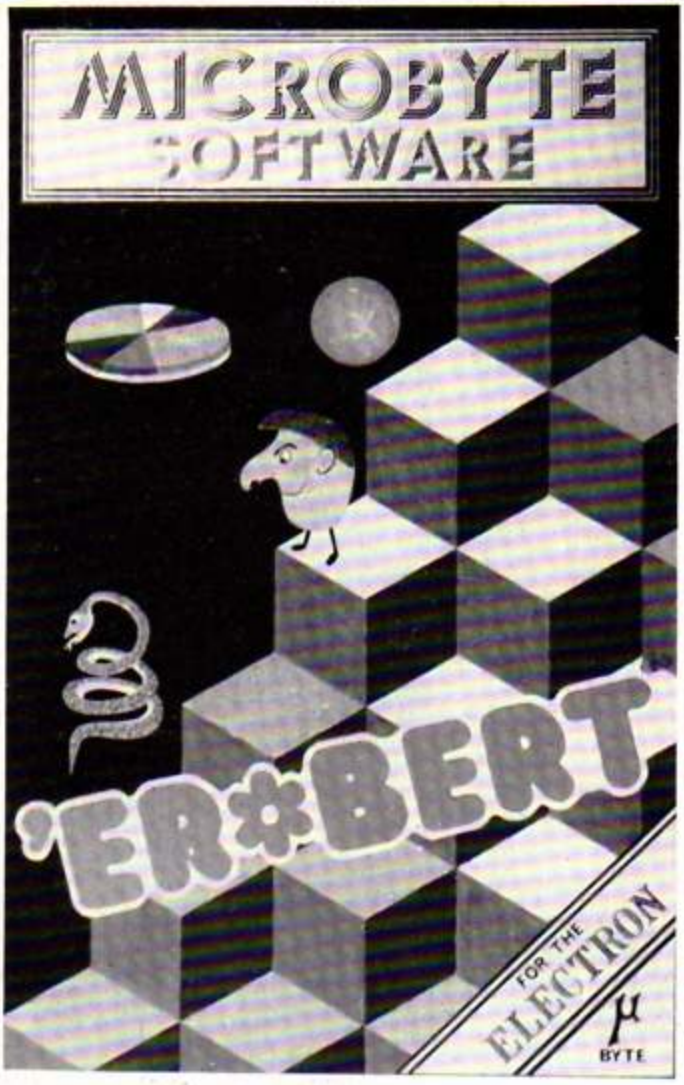

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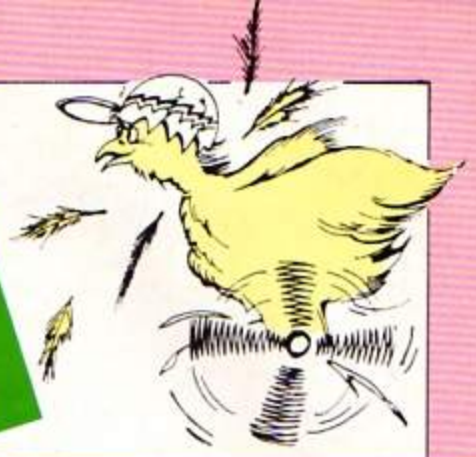

CHICKEN

Car 1 and Car 2 race at each other. It is chicken to turn away first. To win you must have covered more road than the other car. You loose if you crash or fail to stop. Be careful about steering when moving fast, you may skid.

CONTROLS

CAR 1		CAR 2
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ctrl	brake	return
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Z	steer down	/

PRESS SPACE TO SEE WHO'S CHICKEN!

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By ERIC H. CRISP

Full listing starts on Page 53

PROCEDURES

PROCInitial: Initialises variables and car positions and sets up the screen.

PROCInstruct: Initialises the characters, dimensions the arrays and gives instructions.

PROCMove(n): Moves car n to a new position unless stopped.

PROCPlay: The main procedure. Continues until both cars have stopped.

PROCReadkeys: Reads the keyboard and updates "speed" and "steer" accordingly.

PROCResult: Prints the result and waits for the next game.

PROCStatus(n): Reports what happened to car n.

PROCStopped(n): Handles the explosion if car n has crashed.

PROCTest: Tests for a collision.

PROCTest1(n): Tests car n for finished, skidded, ditched or run out of road.

PROCWinner(n): Decides on and prints the winner if both cars stopped successfully.

VARIABLES

car: Flag to indicate which car has stopped. (Values 0=none, 1=car1, 2=car2, 3=both cars.)

collision: Flag to indicate a collision.

count(n): Determines how far car n's explosion has progressed.

distance(n): Records distance travelled by car n before changing direction.

ditch: Flag to indicate which cars have run into the ditch. (See "car" for values.)

end: Whether to start another game (0) or rerun with instructions.

going: Flag to indicate which cars have finished moving and exploding. (See "car" for values.)

I: Loop counter.

n: Local variable for procedures telling them which car is to be considered.

skid(n): The skid speed and direction for car n.

speed(n): Car n's speed.

spin: Records which cars have skidded. (See "car" for values.)

steer(n): Car n's steering speed with direction.

wall: Flag to indicate which car has run out of road. (See "car" for values.)

x(n),y(n): x,y coordinates of car n.

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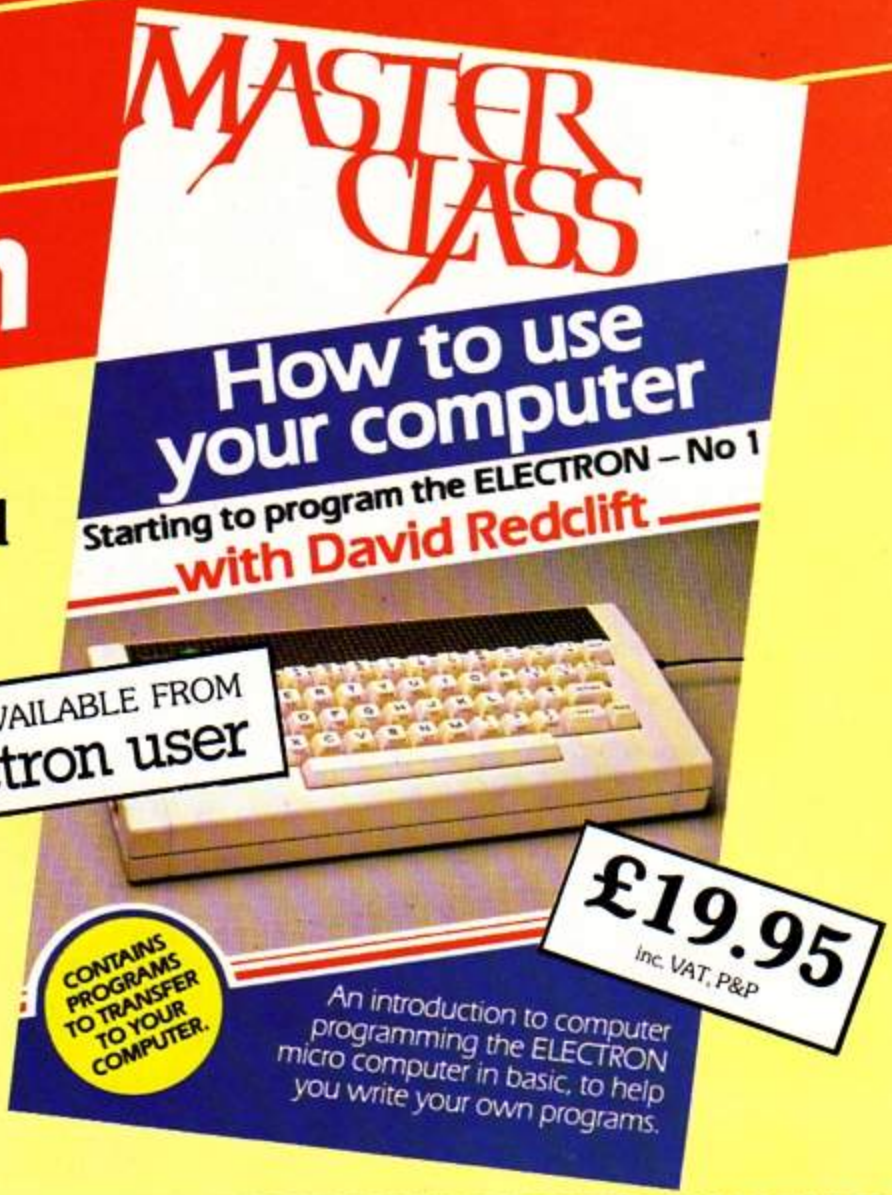

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HERE'S A SUPERB AVERAGE PROGRAM

AVERAGE is a simple 24 line program that will give you the average of a list of numbers

When you run it your Electron will ask you how many numbers you want to take the average of, and then, after you've typed them in, automatically produce the average.

The first two lines are just REM statements – there for information only. The Electron looks at lines 10 and 20 and ignores anything after the REMs.

These lines are just there for giving information to humans and can be left out if you want. The program will still run.

Line 30 selects Mode 6 (if you've just switched on, the micro will be in Mode 6, anyway). Line 40 switches off the text cursor, which can otherwise disrupt the display.

Lines 50 and 60 set the two variables *count* and *total* to zero. These variables are used later in the program and have to be given an initial value or things will get confused.

Try leaving them out and you'll see what I mean.

The next line uses the INPUT keyword to produce two things, a message on the TV screen, and a new variable, *limit*.

The message on the screen asks you how many numbers you want to take the average of.

When you type in a number and press the Return key this number is stored in the variable *limit*.

All the TAB commands do is to arrange the message neatly on the screen. You can leave them out if you so desire, but the screen will look pretty jumbled.

When the Electron comes to the INPUT command of line 70 it will display the message (nicely tabulated) on screen and then wait for a value to be given to *limit*.

The program comes to a stop and only starts again when you actually input a value to satisfy the INPUT command.

Given a value for *limit*, the Electron moves on to line 80 which use CLS to clear the TV screen.

And that's the preliminaries of the program over with. Now we come to the part that does all the real work.

Lines 90 and 110 set up a REPEAT . . . UNTIL loop. This "calls" the procedure PROCinput each time round the loop until *count* is equal to *limit*.

When this happens the program drops out of the loop and goes on to line 120, which calls PROCmean.

This procedure works out the average of the numbers you've typed in and prints it on the screen.

At its simplest level a procedure is just a group of program lines that can be called over and over again by name as required.

The lines that make up the procedures are tucked away at the end of the program and the Electron refers to them automatically when they're called.

As you might guess, line 130 signifies the end of the program.

But, you might ask, if 130 is the end of the program, what about all the lines that follow it?

Well these are where we tuck away the lines that define the procedures that we've called from the main program.

The END of line 130 separates them from the rest of the listing. Try leaving it out and you'll see that the program careers into the procedures after it has done all the work in lines 10 to 120.

Putting END before the procedure definitions ensures that this doesn't happen.

Lines 140 and 190 define PROCinput. The lines in between these are the main body of the procedure and do the work.

This consists of getting you to type in the next number, adding it to the running total kept in *total* and updating *count* to keep track of how many numbers you've typed in.

PROCmean, defined between lines 200 and 240, just calculates the mean average by dividing the sum of all the numbers, *total*, by *count*, the number of figures that you've typed in.

Line 220 just clears the screen, while line 230 prints out the answer.

Simple isn't it? Incidentally, there are two other means you can take, the mode and the median.

The mode is the number that appears most in a set of figures.

If you had 1,2,1,2,2,4,6,5 then the mode is 2 as it appears most often.

The median of a set of numbers is the one that comes in the middle of that set of numbers when it is ordered numerically.

If the numbers are 2,5,4,3,8 then in numeric order is 2,3,4,5,8 and the median is 4.

Can you modify the above program to calculate these values? Have fun trying. I'm told that it is statistically possible!

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter is given on Page 4 of the February issue.

```
10 REM AVERAGE CALCULATOR
20 REM ELECTRON USER
30 MODE 6
40 VDU 23,1,0;0;0;0;
50 count=0
60 total=0
70 INPUT TAB(5,5)"How many
    values do you want"
   TAB(5,7)"to take the
    mean of?"TAB(5,9)"Enter
    the number and press
    Return"TAB(20,13)limit
80 CLS
90 REPEAT
100 PROCinput
110 UNTIL count=limit
120 PROCmean
130 END
140 DEF PROCinput
150 INPUT TAB(5,5)"Please
     enter next number"
    TAB(5,7)"and press Return
    ."TAB(20,13)number
160 PRINT TAB(0,13)STRING$(40
    ," ")
170 count=count+1
180 total=total+number
190 ENDPROC
200 DEF PROCmean
210 mean=total/count
220 CLS
230 PRINT TAB(5,15)"The mean
    is "; mean
240 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 45.

THIS month's Maths Workout is concerned with numeric variables and their limits. Sounds formidable, doesn't it?

Don't worry though, it's not too difficult. After all you've probably already used numeric variables.

If you've ever written a program with a line like:

```
100 LET count=100
```

then you've used a numeric variable, *count*. It's a variable that contains a number, therefore it's a numeric variable. Simple isn't it?

In this article we'll be covering the two types of numeric variables that the Electron can use – real and integer numeric variables – and learning about their uses and limitations.

The first type of numeric variable that we'll meet is the *real* variable.

Like the man who suddenly discovered that he had been speaking prose all his life, you'll be pleased to learn that you've been using real numeric variables all the time without thinking about it!

A real variable is a numeric variable that can stand for both whole numbers – technically called integers – or for numbers that have fractions in them.

Hence in the following lines:

```
10 count=273
20 fraction =1.34
```

both *count* and *fraction* are real variables.

They can both stand for numbers which are decimals or have a decimal part. It just happens that in this case *count* is a whole number.

A numeric variable is always a real variable unless it ends with the percentage sign. But more about this later.

From the way I've been emphasising that real variables have the ability to represent fractions, you've probably guessed that there is a type of numeric variable that can only stand for whole numbers.

This second type of numeric variable is called an *integer* variable. The value you give to this type of variable has to be a whole number.

It can't be a fraction or, rather, a decimal. The Electron does its sums in decimals, not fractions.

CHRIS BARTON'S MATHS workout

Exercises for the Electron

An integer variable name has to end in the percentage sign "%" which you'll find on the keyboard above the number 5.

A variable name ending in % tells the Electron that that name can only represent whole numbers.

The following variables are all integer variables, as you can see from the % at the end of their names:

```
win% = 20
lose% =30
x%=1253
```

You might wonder what happens if you accidentally give an integer variable, say *whole%*, a fractional value, say 1.21. Try it and see. Type in:

```
whole% = 1.21
```

and press the Return key.

Then use the PRINT command to find the value of *whole%* by entering:

```
PRINT whole%
```

As you'll see the Electron has just ignored all the decimal part. The variable *whole%* is now equal to 1, a whole number.

The % at the end of the variable name told the Electron to expect a whole number and that's all it accepted. It took the integer part of the value offered and ignored the rest.

Try it with a few other decimal numbers and you'll soon see how it works.

If we wanted to use a value of 1.21 then we would have to use a real variable – that is to say one that doesn't end in %.

The Electron will happily accept:

```
whole = 1.21
```

as it now has a real variable name to store the decimal in.

The rule is that if you are dealing with whole numbers only then use integer variables. If your variables might have decimal values then stick to real variables.

As you might have noticed when typing in decimal values to integer variables the Electron doesn't tell you when it's lopped off the decimal part.

It just does it and keeps quiet about it!

If you think about it you'll see that this can be a fruitful source of errors if you've mixed up your variable names.

But why have two types of variables in the first place? There are several reasons.

The first is that integer variables take up slightly less precious memory space than real variables.

This makes sense, if you think about it, as with integer variables the Electron doesn't have to worry about finding room to store the decimal part of a number.

When memory space becomes limited, programmers tend to use integer variables if at all possible.

Also integer variables make programs run faster. The Electron can use them much more quickly than real variables.

Again, it doesn't have to bother about fractions, which saves time.

And they are accurate, provided that they stay in range, which we'll come to shortly.

Sometimes integer variables are more realistic. Who ever heard of half a cow or 0.33 of a space invader?

If you think about it, with a real variable, one that works with decimals, there's always room for error. Suppose a real variable, *counts*, was made equal to 1 divided by three.

```
counts = 1/3
```

If you now enter:

```
PRINT counts
```

you'll see that *counts* is now equal to:

```
0.333333333
```

Now, as you know from your maths at school, one divided by three is one third in fractions but is 0.3 recurring in decimals.

This means that the answer isn't really:

```
0.333333333
```

as the Electron tells you, but is actually 0.33333333333333 and so on, the threes carrying on for ever. (If you don't follow that, try dividing one by three in long division.)

Obviously, with numbers that recur like this, the Electron has to draw the line somewhere. It can't keep printing out the answer fo five divided by three for ever.

In fact the Electron draws the line at what is known as nine significant figures. It gives you nine accurate places and then gives up.

You'll see what this means if you look at the result of dividing one by three as we did

Specifications \ Variable	Real	Integer
Example names	Count, Total, limit, X	row%, num% xpos%, A%
Example values	63.78, –1.4, 0.3, 1000	200, –15, 2 , 1000
Maximum size	1.7E38	2,147,483,647
Accuracy limits	nine significant figures	absolute

Figure I: Real and integer variables

above. You get nine 3s after the decimal point and that's it.

Try dividing five by three and you'll see the same thing.

The point is that the Electron works within certain limits of accuracy. What this means is that it will work out a number to nine significant figures of accuracy.

There are ways of changing this, as we'll see in later articles, though nine places is the highest accuracy that you'll get.

In the normal course of events, you won't be too troubled by the accuracy limits of the Electron.

However, if you're writing a program that contains a lot of maths and you start getting some funny results just check that you're not overlooking the Electron's limits. We'll go onto explore these, shortly.

Before we do that, though, I must mention some rather special integer variables known as the *resident integer variables*.

These are the 26 integer variables A%,B%,C% and so on to Y% and Z%.

The resident integer variables work just like normal integer variables but they have one special property.

Normally, when a program is RUN, it clears all the variables that may be in memory from previous programs.

Similarly, entering NEW, pressing the Break key or, even more devastating, pressing CTRL and Break at the same time, has the same effect of clearing the old variables.

They do not, however, get rid of the resident integer variables, hence the name.

One useful result of this is that you can pass results from one program to another via these variables.

Run Program I which assigns values to the resident integer variable *M%* and the real variable *real*.

```
10 REM PROGRAM I
20 LET M%=233
30 LET real=12.89
```

Now press the Break key or enter NEW and press Return. Then run Program II:

```
10 REM PROGRAM II
20 PRINT M%
30 PRINT real
```

Because it is a resident integer variable, *M%* still exists in memory with a value of 233 which is printed out.

However, *real* doesn't exist any more so Program II can't print it out. Hence the error message when the program is run.

Now, let's go on to exploring some of the limits of both types of numeric variables. How big can they be? Is there any limit to the size of either type of variable?

The answer is yes, as you'll see from Figure I. The highest value a real integer can have is 2,147,483,647 which is a lot! The highest value that a real variable can have is 1.7E38.

Now that final figure might look a little odd, but it's just the Electron's way of writing the number that starts with 17 and has 37 Os following it. And that's a big number!

This method of writing numbers is known as the exponential method and it looks more complicated than it really is.

It's just a shorthand way of writing very large numbers, and very small ones. The exponent form is a number, followed by E followed by another number such as:

```
2E3
```

This is actually the number 2000 as you can check by getting the micro to:

```
PRINT 2E3
```

Exponent	Calculation	Value
1E2	1×10×10	100
1E0	1×1	1
1E−1	1×0.10	0.10
2.7E3	2.7×10×10×10	2700
0.8E4	0.8×10×10×10×10	8000

Figure II: Exponential forms

The figure 3 after the capital E means 10 to the power of 3. Or, if you want it another way, 10 multiplied by itself three times, which is 10 × 10 × 10.

It's easy to calculate the powers of 10. You just write down a 1 and follow that with the same number of Os as the power. If the power is 5 you follow the 1 with 5 zeroes.

In this way you can see that E4, or ten to the power of 4, is 10000 – that is 1 with four Os after it. Similarly E6 is 1000000 and E2 is 100.

Two special cases are E1 which is 10 and E0 which is 1. Also E-1 is 0.1 (or one tenth), E-2 is 0.01 (or one hundredth) and so on.

But we were looking at the exponential number 2E3. We can work out that E3 means the number 100 but what of the 2 in front of it?

This simply stands for the number of times that 1000 (E3) should be multiplied.

So 2E3 is another way of writing 2 times 10 to the power of 3, which is just another way of writing 2 × 10 × 10 ×10 which is 2000.

Normally the Electron won't bother with the exponent form for small numbers as it's as easy to write 230 as it is to write 2.3E2.

It's only in the higher ranges that the exponential form is a handy shorthand method of writing large numbers. The Electron automatically swaps over to this form when necessary.

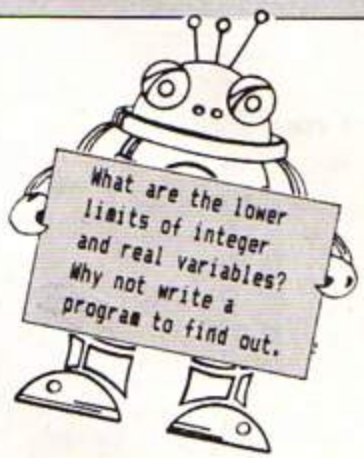
If you're still not too sure about exponentials, take a look at Figure II which shows some numbers in both normal and exponential form.

But let's return to our explorations of the Electron's numerical limits.

Run Program III and see what happens. Is there anything wrong with the result.

```
10 REM PROGRAM III
20 LET X%=999999999
30 LET X%=X%*2
40 PRINTX%
```

What the program is meant to do is multiply 999999999 by 2. If you do it on paper you'll see that the answer is 1999999998. Yet your Electron tells you that the answer is 2E9 which, as you know, is 2000000000. The Electron's answer is out by 2.



This is because we've gone beyond the magic nine significant figures of accuracy. And this is with integer variables which are the most accurate type of numeric variables!

Having said that, an error of 2 in 2000000000 isn't all that much.

Let's further explore the limits of integer variables with Program IV:

```
10 REM PROGRAM IV
20 LET X%=1000
30 REPEAT
50  X%=X%*10
60 PRINT X%
70 UNTIL FALSE
```

This sets an integer variable, *X%*, to 1000 and then multiplies it by 10 each time round the REPEAT . . . UNTIL loop.

When you run the program you'll see the following appear on the screen:

```
    10000
   100000
  1000000
 10000000
100000000
      1E9

Too big at line 50
```

As you can see, the program quite happily prints out the value of *X%*, going into the exponential form when it reaches ten figures.

Eventually the program grinds to a halt with the "Too big" error message when *X%* exceeds the maximum value of an integer variable, which you'll see in Figure I.

Let's see what happens when we take a real variable, *X*, to its limits in Program V.

You'll notice that this is practically the same as Program IV, only the integer variable, *X%*, has become the

From Page 41

real variable, *X*.

```
10 REM PROGRAM V
20 LET X=1000
30 REPEAT
50 LET X=X*10
60 PRINT X
70 UNTIL FALSE
```

Again this prints out the increasing values of the variable until it reaches the maximum limit for a real variable, 1E38. When we try to increase *X* beyond this we get the "Too big" error message:

```
       10000
      100000
     1000000
    10000000
   100000000
         1E9
        1E10
        1E11
        1E12
        1E13
        1E14
        1E15
        1E16
        1E17
        1E18
        1E19
        1E20
        1E21
        1E22
        1E23
        1E24
        1E25
        1E26
        1E27
        1E28
        1E29
9.99999999E29
9.99999999E30
        1E32
        1E33
        1E34
        1E35
9.99999999E35
        1E37
        1E38

Too big at line 50
```

One point of interest is that where you might expect 1E30, 1E31, and 1E36 we get some very strange figures.

If you try working these out on paper you'll see that they are almost the right answers, but not quite. Again the limits of accuracy raise their ugly heads!

Try running Program VI which sets the integer variable, *X%*, to the maximum amount an integer is allowed to be:

```
10 REM PROGRAM VI
20 LET X%=2147483647
30 FOR repeat=1 TO 10
40 LET X%=X%+1
50 PRINT X%
60 NEXT repeat
```

The FOR . . . NEXT loop tries to add 1 to this each time. Yet take a look at the results:

```
-2.14748365E9
-2.14748365E9
-2.14748365E9
-2.14748364E9
-2.14748364E9
-2.14748364E9
-2.14748364E9
-2.14748364E9
-2.14748364E9
-2.14748364E9
```

As you can see, when you go over the maximum limit, you get some very funny numbers!

Program VII tries to do the same thing with a real variable. It sets *X* to its maximum value and then tries to add 1 to it each time round the loop:

```
10 REM PROGRAM VII
20 LET X=1.7E38
30 FOR repeat=1 TO 10
40 LET X=X+1
50 PRINT X
60 NEXT repeat
```

The result is:

```
1.7E38
1.7E38
1.7E38
1.7E38
1.7E38
1.7E38
1.7E38
1.7E38
1.7E38
1.7E38
```

As you can see, the value of *X* remains obstinately the same, refusing to increase beyond its maximum limit.

And that's about it for this month. Try running the programs and messing around with them. You'll soon become a minor expert on numeric variables and their limits. And you'll have fun learning.

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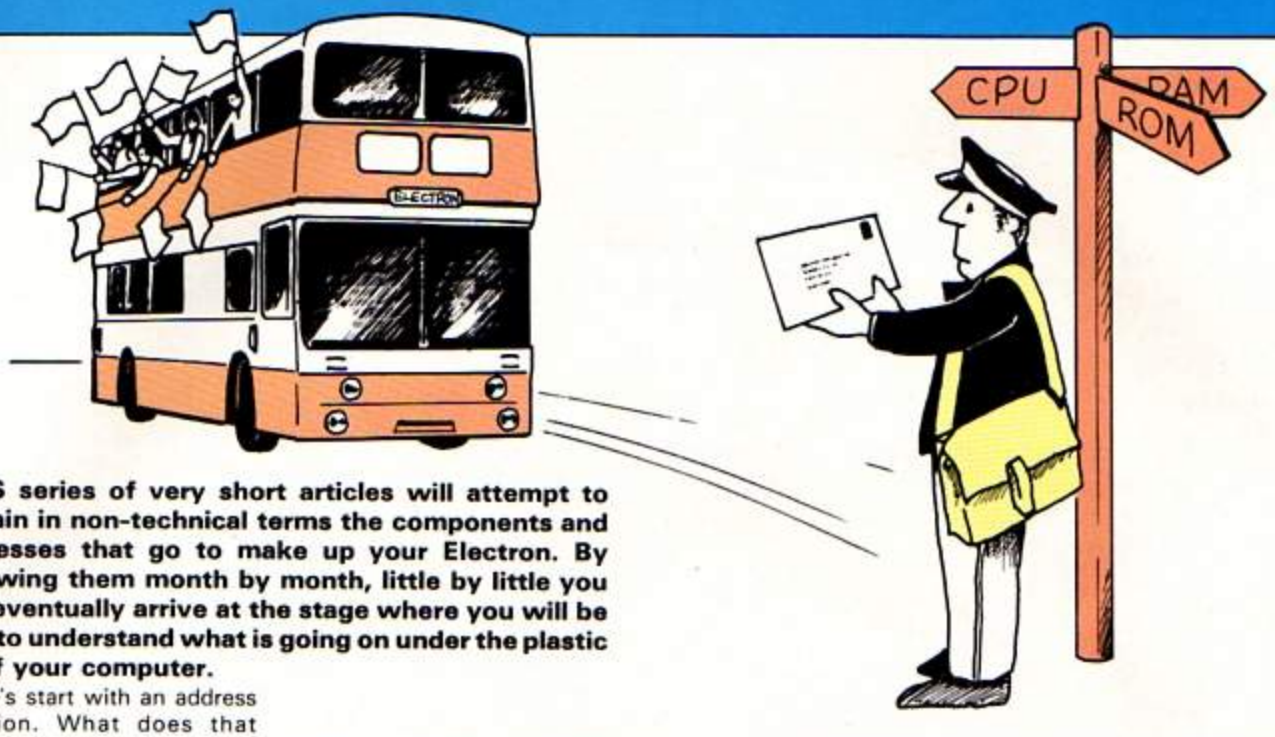


WHAT'S THAT WHEN IT'S AT HOME

MIKE COOK explains the inner workings of the Electron

THIS series of very short articles will attempt to explain in non-technical terms the components and processes that go to make up your Electron. By following them month by month, little by little you will eventually arrive at the stage where you will be able to understand what is going on under the plastic lid of your computer.

Let's start with an address location. What does that mean?

An address is the identification of a location. In postal terms it is where someone lives. In computer terms it is where a number is to be found.

Numbers have very many different meanings, as we shall see later.

The address is specified inside the computer by 16 wires. These are known collectively as the address bus. Each wire can be in one of two states, as indicated by the voltage on the wire.

The two states are known as logic one and logic zero. A high voltage is logic one, a low voltage is logic zero.

You can think of each wire as being like a man holding a flag – the flag can be either up or down.

If there were only one man (or wire) making up the address bus then there would be two possible addresses – flag down or flag up.

Or, in computer terms, address location 0 and address location 1.

If the solitary man were joined by another the number of combinations of raised and lowered flags would be doubled.

This is true for each additional man as the most recently arrived man could first have his flag down for all the previous combinations and then have it high for all the previous combinations.

So for each additional man/wire we can double the number of combinations. (See Table I.)

As the number of address locations doubles it soon gets very large.

This doubling can be expressed in mathematical terms by saying "two raised to the power 16" (the number of wires).

This can be written 2^{16}. It just means that two is multiplied by itself 16 times (2 × 2 × 2 × etc).

As these numbers get very big we tend to use a shorthand way of expressing them.

We say that two to the power 10 is 1k of address locations (k stands for kilo meaning a thousand).

You can see from the table that 1k is not exactly 1,000 but 1,024. It's a sort of "Baker's Dozen" version of a thousand!

So we say that an address bus with 16 wires can address 64k address locations (64 × 1024 = 65,536).

This is the maximum number of different address locations the Electron can cope with. In fact it is the maximum for most home computers.

There are tricks you can play to make the computer appear to handle more address locations but nothing can really extend this number.

At each address location a number is stored. Therefore an address location is sometimes called a memory location because the number is usually stored in some kind of memory.

The number itself is effectively made up of eight flags, which means that it can consist of one of 256 possible combinations.

Each flag has its own wire. The collection of the eight wires is known as the data bus and is common to all 64k of memory locations.

Each memory location reports its contents over the same wires. So only one address location can be read (or looked at) at any instant.

Each individual flag in a memory location is known as a bit and the eight bits together are called a byte.

Incidentally, four bits (or half a byte) are known as a nibble (can't you just tell it's American technology?)

The major part of your Electron is a vast number of address locations – just like a housing estate – with each location containing something different.

In fact everything connected to the computer – memory, cassette recorder, sound channel or TV circuit – has to have its own unique address.

A plan of what address is assigned to what device is called a memory map. You can find one in the Electron User Guide.

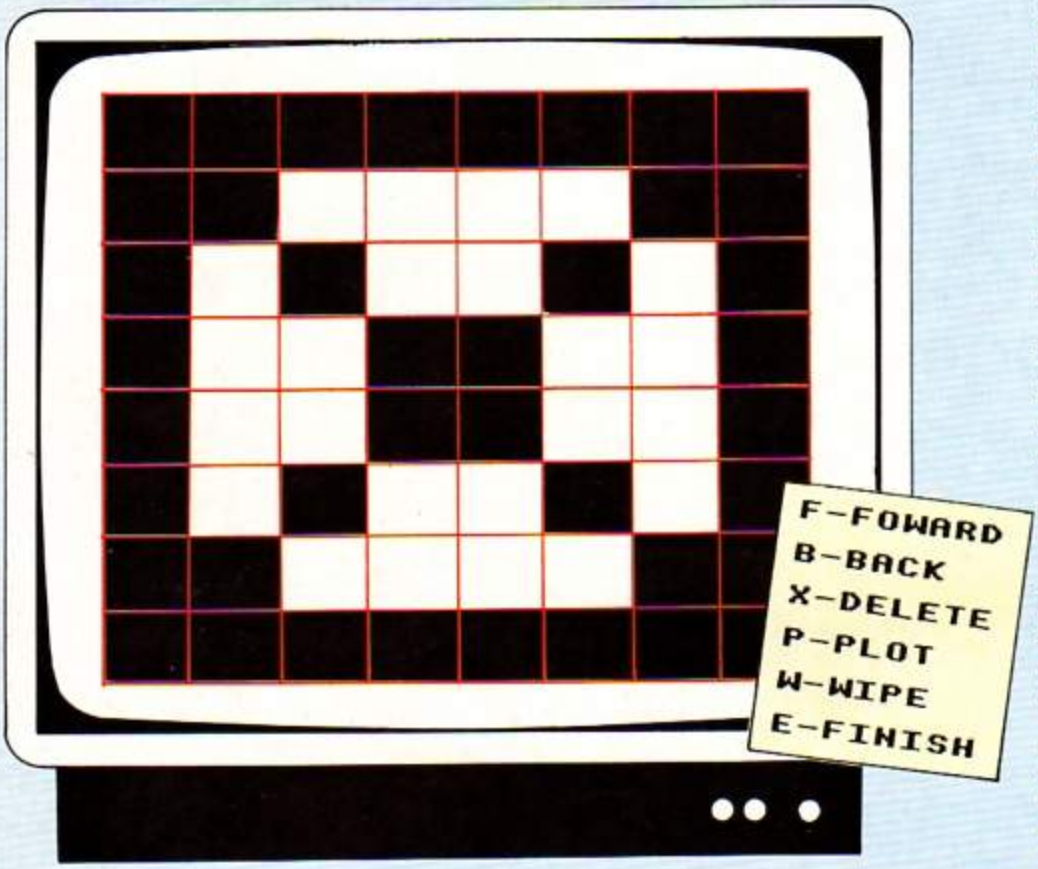
The various devices the computer uses to store its numbers in will be looked at in next month's issue of Electron User.

Number of wires	Number of addresses	
1	2	
2	4	2 × 2
3	8	2 × 2 × 2
4	16	2 × 2 × 2 × 2
5	32	etc.
:	:	
8	256	
:	:	
10	1,024	
:	:	
16	65,536	

Table I

Character generating without tears

By NICHOLAS TIMBERLAKE



HAVE you ever wanted to create some shapes for Casting Agency but been put off by the maths involved? Never fear, *Electron User* comes to your aid with this-easy-to use Character Generator.

Using your Electron's keyboard you can draw the character you want directly on the TV screen.

When you are satisfied with it the Electron will do the sums for you and tell you all the figures that make up that character and show you what it looks like.

It will even remember previous characters that you've typed in.

All the instructions are in the program. Type it in, run it and creating new shapes for Casting Agency will be easy. The only limit is your imagination.

Why not send your new shapes to our Casting Agency? After all, now we've made it simple – it's all at the touch of a finger.

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter is given on Page 4 of the February issue.

```
10 REM ********************
   ****
20 REM * *
30 REM * CHARACTER GENERAT
   OR *
40 REM * FOR THE ELECTRON
   *
50 REM * *
60 REM * BY N.TIMBERLAKE
   *
70 REM * *
75 REM * (C) ELECTRON
   USER *
80 REM ********************
   ****
90 VDU 23,255,60,66,153
   ,161,161,153,66,60
100 DIM N(8)
   :DIM T%(50)
110 MODE 6
   :CLS
   :PRINT TAB(11,10)
   CHR$ 131"Instructions(Y
   /N) ";
   :G$=GET$
   :IF G$<>"Y" AND G$<>
   "N"
   THEN GOTO 110
120 IF G$="Y"
   THEN MODE 1
   :PROCINSTRUCTIONS
130 MODE 1
140 VDU 28,0,31,39,0
   :CLS
150 PRINT TAB(2,1)"--------
   ----------"
160 GCOL 0,1
   :PROCSCREENPLOT
170 CLS
   :PRINT
   :PRINT "OPTION:";
   :G$=GET$
180 OJ=0
190 IF G$="V"
   THEN PROCCHARVIEW
200 IF G$="D"
   THEN GCOL 0,1
   :CLS
   :CLG
   :PROCSCREENPLOT
   :PROCDRAW
210 IF INKEY (-55)
   THEN CLS
   : PRINT "WHICH ONE";
   :INPUT CH
   :CLS
   :PRINT :CH;" ";
   CHR$ CH
   :H$=INKEY$ (300)
220 GOTO 170
230 DEF PROCCHARVIEW
240 FOR A=225 TO 255
250 PRINT TAB(31);A;" ";
   CHR$ A:
260 SOUND 1,-15,80,1
270 G$=INKEY$ (10)
   :IF G$="W"
   THEN G$=GET$
280 IF G$="S"
   THEN ENDPROC
290 NEXT
300 GOTO 170
310 DEF PROCDRAW
320 X%=155
   :Y%=845
```

Turn to Page 46

Make light work of listings!

All program listings in *Electron User* have been put on tape – to save you the chore of keying them in yourself. Three tapes are now available – one for March, one for February, and an introductory tape of all the programs from the first few introductory issues.

On the March tape:

CHICKEN Let dangerous drivers test your nerve. **COFFEE** A tantalising word game from Down Under. **PARKY'S PERIL** Parky's lost in an invisible maze. **REACTION TIMER** How fast are you? **BRAINTEASER** A puzzling program. **COUNTER** Mental arithemetic can be fun! **PAPER, SCISSORS, STONE** Out-guess your Electron. **CHARACTER GENERATOR** Create shapes with this utility. **FUNNY POLYGONS** Fast graphics going round in circles. **RABBITS** Easter bunnies all over! **DRAW** Multi-coloured lines. **MEAN** Just an average program.

On the February tape:

NUMBER BALANCE Test your powers of mental arithmetic. **CALCULATOR** Make your Electron a calculator. **DOILIES** Multi-coloured patterns galore. **TOWERS OF HANOI** The age old puzzle. **LUNAR LANDER** Test your skill as an astronaut. **POSITRON INVADERS** A version of the old arcade favourite. **MOON RESCUE** Avoid the asteroids and save the spacemen. **STARS** A program making pretty pictures. **TAPESTRY** Symmetry and colour combine.

On the introductory tape:

ANAGRAM Sort out the jumbled letters. **DOODLE** Multicoloured graphics. **EUROMAP** Test your geography. **KALEIDOSCOPE** Electron graphics run riot. **CAPITALS** New upper case letters. **ROCKET, WHEEL, CANDLE** Three fireworks programs. **BOMBER** Drop the bombs before you crash. **DUCK** Simple animation. **METEORS** Collisions in space. **COMBINATIONS** Crack the hidden code. **BUZZ WORD GENERATOR** Let the Electron help you impress. **SIMON** Reactions and memory put to the test. **3-D PLOT** Enter a new dimension. **PLUS LOTS MORE!**

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Character Generator listing

From Page 44

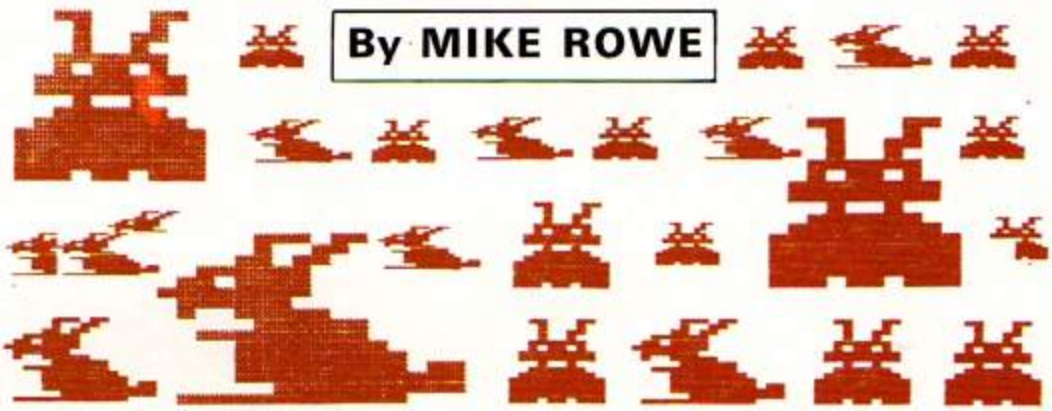
```
330 PRINT TAB(0,2)"F-FOWARD
    "
340 PRINT TAB(0,4)"B-BACK"
350 PRINT TAB(0,6)"X-DELETE
    "
360 PRINT TAB(0,8)"P-PLOT"
370 PRINT TAB(0,10)"W-WIPE"
380 PRINT TAB(0,12)"E-FINIS
    H"
390 IF Y%>900
    THEN Y%=845
400 YN$="Q"
410 GCOL 0,3
    :PLOT 69,X%,Y%
420 G$=GET$
430 IF G$="W"
    THEN CLG
    :GCOL 0,1
    :PROCSCREENPLOT
    :PROCDRAW
440 IF G$="P"
    THEN DRAW X%+55,Y%+55
    :DRAW X%-55,Y%-55
    :PLOT 85,X%-55,Y%+55
    :DRAW X%+55,Y%+55
    :DRAW X%-55,Y%-55
    :PLOT 85,X%+55,Y%-55
450 IF G$="F"
    THEN GCOL 0,0
    :PLOT 69,X%,Y%
    :X%=X%+110
    :IF X%>980
    THEN X%=155
    :Y%=Y%-110
460 IF G$="B"
    THEN GCOL 0,0
    :PLOT 69,X%,Y%
    :X%=X%-110
    :IF X%<155
    THEN X%=925
    :Y%=Y%+110
470 IF G$="X"
    THEN GCOL 0,0
    :DRAW X%+55,Y%+55
    :DRAW X%-55,Y%-55
    :PLOT 85,X%-55,Y%+55
    :DRAW X%+55,Y%+55
    :DRAW X%-55,Y%-55
    :PLOT 85,X%+55,Y%-55
    :GCOL 0,1
    :PROCSCREENPLOT
480 IF G$="E" OR Y%<40

    THEN PRINT TAB(0,20)
    "PRESS 'Y' IF YOU
      HAVE  FINISHED";
    :YN$=GET$
490 IF YN$<>"Y"AND YN$<>
    "Q"
    THEN Y%=75
    :X=925
500 IF YN$="Y"
    THEN GCOL 0,0
    :OJ=2
    :PROCSCREENPLOT
    :PROCVDU
510 IF OJ=2
    THEN GCOL 0,1
    :GOTO 140
520 PRINT TAB(0,20)"
                    "
530 GOTO 390
540 DEF PROCSCREENPLOT
550 RESTORE
560 READ TU%,XT%,YT%
570 IF TU%=1
    THEN MOVE XT%,YT%
580 IF TU%=0
    THEN DRAW XT%,YT%
590 IF TU%=50
    THEN GOTO 630
600 GOTO 560
610 DATA 1,100,20,0,980
    ,20,0,980,900,0,100
    ,900,0,100,20,1,100
    ,130,0,980,130,1,980
    ,240,0,100,240,1,100
    ,350,0,980,350,1,980
    ,460,0,100,460,1,100
    ,570,0,980,570,1,980
    ,680,0,100,680,1,100
    ,790,0,980,790,1,980
    ,900,0,100,900
620 DATA 1,210,20,0,210
    ,900,1,320,900,0,320
    ,20,1,430,20,0,430
    ,900,1,540,900,0,540
    ,20,1,650,20,0,650
    ,900,1,760,900,0,760
    ,20,1,870,20,0,870
    ,900,50,0,0
630 VDU 28,31,30,39,0
640 ENDPROC
650 DEF PROCVDU
660 CLS
670 PRINT "CHARACTER NUMBER
      (225-255)";
    :INPUT CHR
680 IF CHR>255
    THEN CLS
    :PRINT "TOO BIG"
    :GOTO 670
690 IF CHR<225
    THEN CLS
    :PRINT "TOO SMALL"
    :GOTO 670
700 X%=970
    :Y%=890
    :K=.5
    :L=0
710 L=L+1
    :IF L>8
    THEN GOTO 820
720 FOR F=1 TO 8
730 K=K+K
740 IF POINT(X%,Y%)=3
    THEN N(F)=K
    ELSE N(F)=0
750 X%=X%-110
760 NEXT F
770 Y%=Y%-110
    :X%=970
780 T%(L)=N(1)+N(2)+N(3)+N(
    4)+N(5)+N(6)+N(7)+N(8)
790 PRINT TAB(31);T%(L);
800 K=0.5
810 GOTO 710
820 VDU 23,CHR,T%(1),T%(2)
    ,T%(3),T%(4),T%(5)
    ,T%(6),T%(7),T%(8)
830 VDU 28,0,31,39,0
    :CLS
    :CLG
    :PRINT TAB(20,15);
    CHR$ CHR
    :PRINT TAB(3,5)"VDU";23
    :",";CHR;",";T%(1);
    ",";T%(2);",";T%(3);
    ",";T%(4);",";T%(5);
    ",";T%(6);",";T%(7);
    ",";T%(8);"  "
    :PRINT TAB(7,25)"Press
     any key to continue";
    :G$=GET$
840 ENDPROC
850 DEF PROCINSTRUCTIONS
860 CLS
870 COLOUR 1
    :PRINT TAB(10,2)"CHARAC
    TER DEFINER"
    :PRINT TAB(10,3)"======
    === ========"
880 COLOUR 3
    :PRINT TAB(0,5)"Firstly
     the computer will
     print-OPTION-.You
     can answer this in
     a number of ways depen
    ding on what you want
     to do."
890 COLOUR 2
900 PRINT TAB(2,9)"To list
     characters 'V'"
910 PRINT TAB(2,11)"To
     list just one characte
    r 'O'"
920 PRINT TAB(2,13)"To
     draw a character 'D'"
930 PRINT TAB(2,15)"To
     leave the progra
     press 'BREAK'"
940 PRINT TAB(4,28)"Press
     any key to continue";
    :G$=GET$
950 CLS
    :COLOUR 1
    :PRINT TAB(0,3)"If
     you pressed'V'-"
960 COLOUR 2
    :PRINT TAB(18,3)"Charac
    ters will appear"
    TAB(19,4)"on the screen
     next to"TAB(19,5)
     "their appropriate"
    TAB(19,5)"numbers.To
     make the"TAB(19,6)
     "listing pause press"
    TAB(19,7) "CTRL and
     SHIFT"
970 COLOUR 1
    :PRINT TAB(0,9)"If
     you pressed'O'-"
980 COLOUR 2
    :PRINT TAB(18,9)"Charac
    ter number will"
    TAB(19,10)"appear on
     the screen."TAB(19
    ,11)"To this you enter
     the"TAB(19,12)"number
     of the"TAB(19,13)
    "character required."
990 COLOUR 1
    :PRINT TAB(0,15)"If
     you pressed'D'-"
1000 COLOUR 2
    :PRINT TAB(18,15)"A
     grid will appear on"
    TAB(19,16)"the screen
     with a"TAB(19,17)
    "dot in the top right"
    TAB(19,18)"hand corner
     of the"TAB(19,19)
    "grid.This is your"
    TAB(19,20)"cursor.";
1010 PRINT "All other"
    TAB(19,21)"instructions
     are"TAB(19,22)"explain
    ed later in"TAB(19
    ,23)"the program."
1020 PRINT TAB(4,29)"Press
     any key to continue";
    :G$=GET$
    :ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 45.

You've read the book, you've seen the film – maybe even eaten the pie – but now you can have . . .

Bright eyes computerised!

By MIKE ROWE



FILL your TV screen with Easter Bunnies with this simple program from Mike Rowe. He sent the rabbits in for Casting Agency, but his listing is so good that we decided to run it as a feature in its own right.

What next? Will readers send in programs with sheep leaping over gates? This would be a boon for insomniacs.

Will we have a fox and hounds hurtling across the screen? Low flying Electron pigs? We can't wait!

THIS program is quite simple to type in and easy to understand. Line 90 puts the Electron into Mode 2. If you want to see what the rabbits look like in other modes then just alter this line.

Line 100 fixes the number of rabbits at two, and the next line sets the Electron's internal stopwatch to zero.

The main work of the program is done in PROC rabbits, which you'll find between lines 290 and 460.

You'll recognise the VDU23s from Casting Agency and, as you might guess, these lines define the bunnies.

Lines 380 and 390 use the RND and COLOUR keywords to change the bunnies' colour at random.

The RND command is used again in line 400 to decide where the rabbits are to be printed, and the remaining lines put the bunnies on the screen.

You'll see from the listing that PROCrabbit appears twice.

The first time is in line 140 when it prints two rabbits. Line 150 causes the Electron to pause for half a second (you'll see that this line is used to create two more pauses).

Line 230 calls PROCrabbit again and, since it is in the FOR . . . NEXT loop formed by lines 200 and 240, it fills the screen with bunnies. Incidentally, VDU7 just makes the Electron beep.

PROCend, which is called in line 260, is defined between lines 480 and 520. All it does is to clear the screen of rabbits (line 490) and print the final message.

And that's all there is to it. Anyone for a jumping sheep program?

```
10 REM #In answer to
   request for "Shapes"
20 REM this program draws
   rabbits breeding
   all over the screen
30 REM from..MIKE ROWE
40 REM (C) ELECTRON USER
50 REM
60 REM The rabbits are
   drawn in PROCrabbits
70
80
90 MODE 2
100 rabbits=2
110 TIME =0
120 PRINT ''' " WE START
    OFF WITH 2 RABBITS"
130 VDU 7
140 PROCrabbits
150 REPEAT UNTIL TIME =50
160 CLS
180 PRINT '''' "THEN...."
190 TIME =0
    :REPEAT UNTIL TIME =50
200 FOR rabbits = 2
    TO 100
210 TIME =0
    :REPEAT UNTIL TIME =50

220 VDU 7
230 PROCrabbits
240 NEXT rabbits
250
260 PROCend
270
280 END
290 DEF PROCrabbits
300 VDU 23,240,7,4,13
    ,63,111,255,126,79
310 VDU 23,241,96,192
    ,128,0,0,0,0,128
320 VDU 23,242,7,63,15
    ,15,15,15,3,127
330 VDU 23,243,224,224
    ,240,248,251,255,255
    ,248
340 VDU 23,244,6,2,2,2
    ,7,5,15,15
350 VDU 23,245,48,32,96
    ,64,224,160,240,240
360 VDU 23,246,2,7,15
    ,31,31,31,31,29
370 VDU 23,247,64,224
    ,240,248,248,248,248
    ,184
380 J=RND(14)-1
390 COLOUR J
400 X=RND(18)
    :Y=RND(30)
410 PRINT TAB(X,Y)CHR$ (240
    );CHR$ (241)
420 PRINT TAB(X,Y+1)
    CHR$ (242);CHR$ (243)
430 PRINT TAB(X+2,Y)
    CHR$ (244);CHR$ (245)
440 PRINT TAB(X+2,Y+1)
    CHR$ (246);CHR$ (247)
460 ENDPROC
470
480 DEF PROCend
490 CLS
500 COLOUR 3
    : COLOUR 130
510 PRINT TAB(0,10)"
      The TV is clogged
    up with rabbits "
520 ENDPROC
```

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter is given on Page 4 of the February issue.

This listing is included in this month's cassette tape offer. See order form on Page 45.

Guide Parky the

POOR little Parky has got himself lost, and the only way home is through a maze. The trouble is that the walls of the maze are invisible. This means that Parky has to travel through it one step at a time, marking out the route as he goes.

Your job is to guide the poor little fellow through the labyrinth using your Electron's keyboard. If and when you're successful your micro will tell you how long you took and offer you another go.

It's fun to play and compulsive as well.

PROCEDURES

PROCmove
As you might guess this is the procedure that moves Parky (VDU 224) around the screen.

PROCscreen
This sets up the screen, reading the DATA statements and drawing the maze.

PROCinstruct
This tells the Electron to display the instructions on the TV screen.

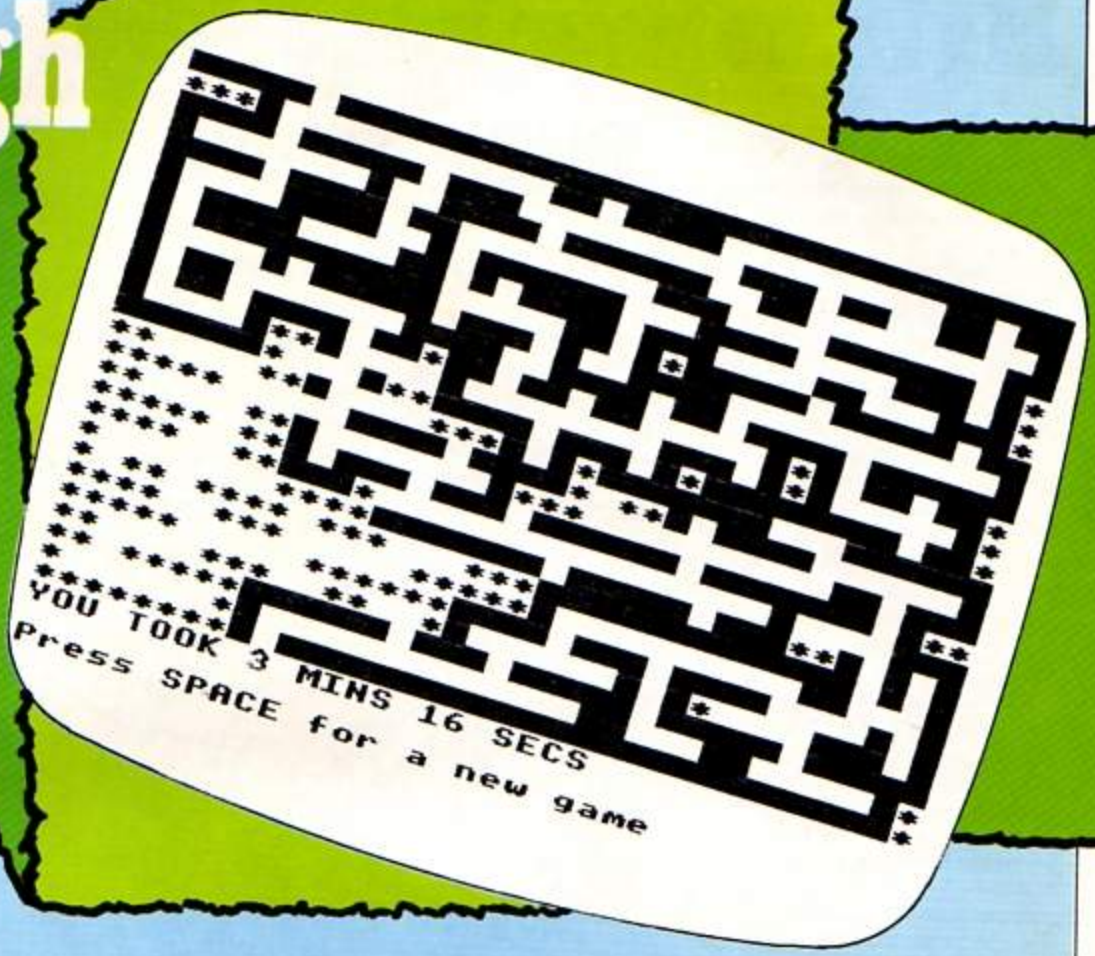
PROCinit
As is implied in the name this procedure "initialises" the variables, setting them to their original values. It also defines Parky and sets up the ENVELOPE that controls the sound produced when he moves.

Parky listing

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter is given on Page 4 of the February issue.

```
 10 MODE 1
 20 VDU 23,0,8202;0;0;0;
 30 REPEAT
 40 CLS
    :COLOUR 2
    :VDU 19,1,4;0;
 50 PROCinstruct
 60 PROCinit
 70 PROCscreen
 80 TIME =0
 90 REPEAT
100 IF INKEY (-104)AND
    POINT(X%+48,Y%-16)=0X%=X%
    +32
    :SOUND 1,1,40,1
110 IF INKEY (-103)AND
    POINT(X%-16,Y%-16)=0X%=X%
    -32
    :SOUND 1,1,50,1
120 IF INKEY (-98)AND
    POINT(X%+16,Y%-48)=0Y%=Y%
    -32
    :SOUND 1,1,80,1
130 IF INKEY (-66)AND
    POINT(X%+16,Y%+16)=0Y%=Y%
    +32
    :SOUND 1,1,90,1
140 IF X%>=1120X%=32
150 IF POINT(X%+48,Y%-16)=3
     MOVE X%+32,Y%
    :VDU 225
160 IF POINT(X%-16,Y%-16)=3
     MOVE X%-32,Y%
    :VDU 225
170 IF POINT(X%+16,Y%-48)=3
     MOVE X%,Y%-32
    :VDU 225
180 IF POINT(X%+16,Y%+16)=3
     MOVE X%,Y%+32
    :VDU 225
190 IF POINT(X%-16,Y%+16)=3
     MOVE X%-32,Y%+32
    :VDU 225
200 IF POINT(X%-16,Y%-48)=3
     MOVE X%-32,Y%-32
    :VDU 225
210 IF POINT(X%+48,Y%+16)=3
     MOVE X%+32,Y%+32
    :VDU 225
220 IF POINT(X%+48,Y%-48)=3
     MOVE X%+32,Y%-32
    :VDU 225
230 PROCmove
240 UNTIL Y%=128
250 VDU 4,20
260 COLOUR 2
270 *FX15,1
275 SOUND 1,1,200,50
280 PRINT "YOU TOOK ";(
    TIME DIV 6000)MOD 60;
    " MINS ";(TIME DIV 100)
    MOD 60;" SECS"
290 PRINT '"Press SPACE for
     a new game"
300 A=GET
    :IF A<>32
    THEN 300
310 UNTIL 0
320 DEF PROCmove
330 MOVE X%,Y%
    :VDU 224
340 MOVE A%,B%
    :VDU 224
350 A%=X%
    :B%=Y%
360 ENDPROC
370 DEF PROCscreen
380 VDU 4
    :CLS
    :PRINT
390 RESTORE
400 COLOUR 3
    :VDU 19,3,0;0;
410 FOR N%=0TO 25
    :READ A$
    :PRINT A$
```

through maze




```
    :NEXT
420 GCOL 3,1
    :VDU 5
430 ENDPROC
440 DEF PROCinstruct
450 PRINT TAB(15,0)"Parky's
    Peril"
460 PRINT '''"Poor little
    Parky has gone  and
    got "'''"lost (ahh).
    Your job is to get him"'
    '"through the maze in
    as little time as"''
    "possible. To start with
    all of the maze"'"is
    hidden, but more will
    appear as you"''"travel
    further."
470 PRINT TAB(15,18)"A  =
    UP"TAB(15,20)"Z  =
    DOWN"TAB(15,22)"<
    =  LEFT"TAB(15,24)">
    =  RIGHT"
480 PRINT TAB(10,29)"PRESS
    SPACE TO PLAY"
    :REPEAT UNTIL 32=GET
485 ENDPROC
490 DEF PROCinit
500 X%=32
    :Y%=992
    :B%=-32
    :A%=-32
510 VDU 23,224,24,60,90
    ,255,219,66,126,36
520 VDU 23,225,255,255,255
    ,255,255,255,255,255
525 ENVELOPE 1,1,20,-20
    ,20,200,200,200,127
    ,127,127,127,127,127

530 ENDPROC
540 DATA "***** **************
    ******************"
550 DATA "****
    ** ****         ** **"
560 DATA "**** ***** ***
             *** **  **
    *"
570 DATA "*       *  ****
    ******  **        **"
580 DATA "**** **** **
         ***    ****** **"
590 DATA "*    ****  * ******
       ****    *** **"
600 DATA "* ****    ** *
     **** ***    **   ****"
610 DATA "* **********
       ** ******* ***** **"
620 DATA "*    * ***** ***
     *  ****          *"
630 DATA "* **       ****
     **** ** **** ******"
640 DATA "* ** **** *****
     ** **     *** ** ***"
650 DATA "*    ****    *
            *** ***     **"
660 DATA "*******   *******
     *** ********** ***"
670 DATA "**    ***    ****
     *********   ******"
680 DATA "*****     ****
     ***** *** ****
     *"
690 DATA "**    ***
      ****          ** ***"
700 DATA "***** *** *** ***
     ****** ******* ***"
710 DATA "****  ******
                *    ***"
720 DATA "*       ***********
     ***** ****** * *"
730 DATA "* ** **** ***
      ***************** *
     *"
740 DATA "****  ***     *****
     *          **   *"
750 DATA "*****     **********
     * *** ****    * *"
760 DATA "**    ***  **
     **      * **    ***
     *"
770 DATA "** ***********
     *** ***** ***** *****"
780 DATA "*      **
           **   **     **"
790 DATA "********* *********
    ******************"
```

This listing is included in this month's cassette tape offer. See order form on Page 45.

Make up your mind with your micro

By PETE BIBBY

HAVE you ever had difficulty making up your mind? Does having to make a decision cripple you with anxiety?

Never fear, *Electron User* is here with our state-of-the-art Decision Maker.

Let the micro take the decisions that you can't and won't take for yourself. Just ask the question, run the program and the Electron supplies the answer.

And if you don't like it you can just press a key and see if it comes up with an answer you *do* like!

The program is quite simple.

Lines 50 to 100 just print the answers on the screen. If you want a different selection of answers all you have to do is to replace the ones in the inverted commas in these lines.

Lines 110 to 130 select the colours to be used.

Line 140 switches off that annoying flashing cursor.

Lines 170 to 270 form a FOR . . . NEXT loop which moves the square "pointer" up and down the screen 20 times.

Line 230 makes a sound each time the pointer moves.

Lines 295 and 300 provide the "decided" sound.

The variables *ypos, newpos* keep track of the pointer's position up and down the screen.

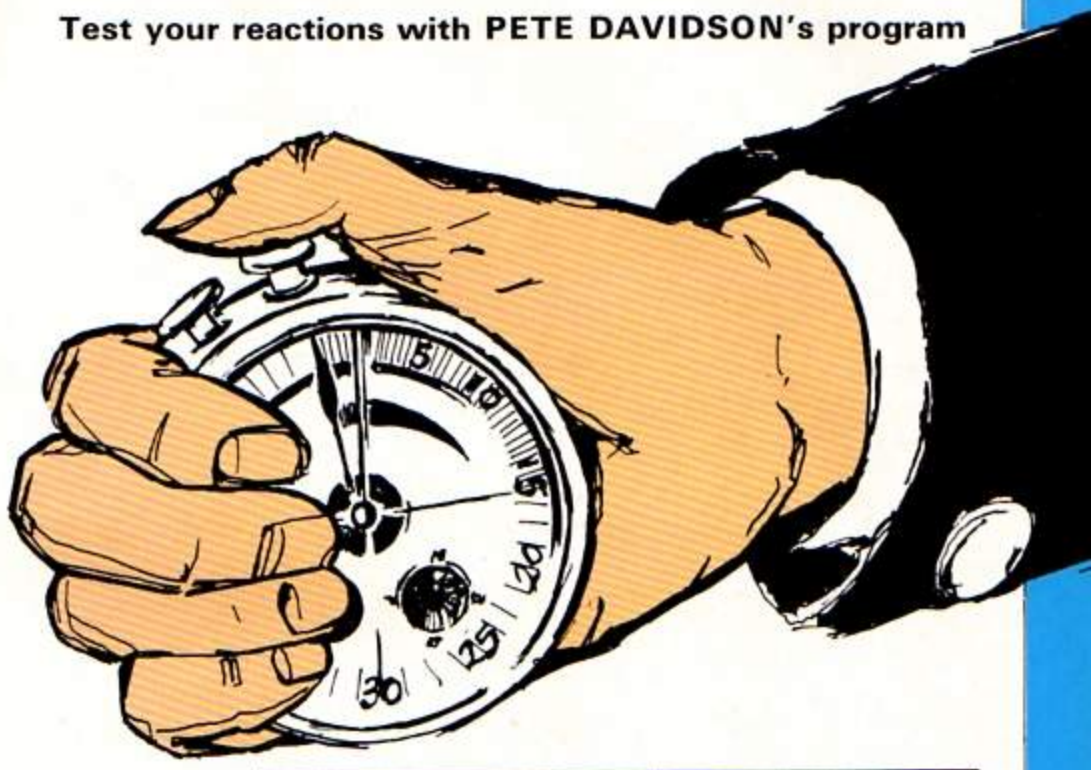
This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter is given on Page 4 of the February issue.

```
10 REM DECISION MAKER
20 REM (C) ELECTRON USER
30 REPEAT
40 MODE 1
50 PRINT TAB(5,3) "DON'T
   EVEN ASK....."
60 PRINT TAB(5,8) "NO.....
   ....."
70 PRINT TAB(5,13) "MAYBE.
   ....."
80 PRINT TAB(5,18) "PUT
   IT OFF....."
90 PRINT TAB(5,23) "ASK
   ME ANOTHER TIME...."
100 PRINT TAB(5,28) "YES...
   ....."
110 VDU 19,0,4,0,0,0
120 VDU 19,3,3,0,0,0
130 VDU 19,2,12,0,0,0

140 VDU 23,1,0;0;0;0
150 COLOUR 129
160 ypos=6*RND(5)-2
170 FOR X= 1 TO 20
180 newpos=5*RND(6)-2

190 IF newpos=ypos
    THEN GOTO 180
200 ypos=newpos
210 COLOUR 129
220 PRINT TAB(28,ypos)
    CHR$ (32)
230 SOUND &11,-15,50+X*10
    ,5
240 FOR delay=1 TO 250
    : NEXT delay
250 COLOUR 128
260 PRINT TAB(28,ypos)
    CHR$ (32)
270 NEXT X
280 COLOUR 130
290 PRINT TAB(28,ypos)
    CHR$ (32)
295 ENVELOPE 2,2,6,0,0
    ,255,0,0,126,0,0,-126
    ,126,126
300 SOUND &11,2,4,50
310 WAIT$=GET$
320 UNTIL FALSE
```

This listing is included in this month's cassette tape offer. See order form on Page 45.

Ready, steady, GO!

Test your reactions with PETE DAVIDSON's program



FIND out how fast you are with our Electron reaction timer. Are you quicker off the mark than your friends? Does your reaction time vary as the day goes on? Kids, are you faster than your parents? Type in this listing and find out.

When you run the program a white bar will appear on the left of the screen. Watch it carefully because soon it's going to change colour, beeping every time to give you a warning.

At first it becomes red. Then, like a set of traffic lights, it will change to yellow. This tells you to be prepared because green is the next colour and you're going to have to react quickly.

As soon as it turns to green (but not before!) you have to press the space bar. The Electron will then tell you how fast your reactions are and what it thinks of them.

PROCEDURES

PROCINIT
This procedure prints out the instructions, defines the characters and initialises the variables. It also initialises the messages in an array, M$. These can be altered by changing the DATA in line 610, but don't make them too rude!

PROCWAIT
Calls PROCCOLOUR after working out different parameters. This causes a random wait before the bar changes colour.

PROCTEST
Calls PROCTOOSOON if you press the space bar too quickly. Otherwise it records the time you take to press the space bar in the integer variable T%.

PROCCOLOUR
Changes the colour of the bar after a random time.

PROCTOOSOON
Gives a message if you press the space bar too soon. Don't we all!

PROCMESSAGE
Prints out a message (surprise, surprise). What the message is depends on how long it takes you to react. The time (T%) has 1 subtracted from it because it takes approximately a hundredth of a second for the program to reach this instruction.

The message given is chosen from the data in line 610. The number of the message is calculated by dividing T% by 10.

Reaction Timer listing

```
10 REM (C) ELECTRON USER
20 REM BY PETE DAVIDSON
30 MODE 4
   :DIM M$(7)
   :PROCINIT
40 PROCWAIT
50 PROCTEST
60 PROCMESSAGE
70 *FX15,1
80 A=GET
   :RUN
90 END
100 DEF PROCINIT
110 CLS
   :PRINT ''"        REACTION
     TESTER"
120 PRINT "        ___________
    _____"
130 PRINT '"     Use this
     program to test your"
140 PRINT "reactions."
150 PRINT "
          ";
160 PRINT '"     The white
     bar which will appear
     on"
170 PRINT "the left of the
     screen will change"
180 PRINT "colour. It will
     follow the sequence
     of"
190 PRINT "traffic lights
     (red, yellow, green)."
200 PRINT "Each time the
     colour changes, you
     will"
210 PRINT "hear a beep."
220 PRINT "

          ";
230 PRINT '"     Press the
     space bar as soon as
     the"
240 PRINT "colour changes
     to green (at the third"
250 PRINT "beep)."
260 PRINT "

          ";
270 PRINT '"     Your time
```

Reaction Timer listing

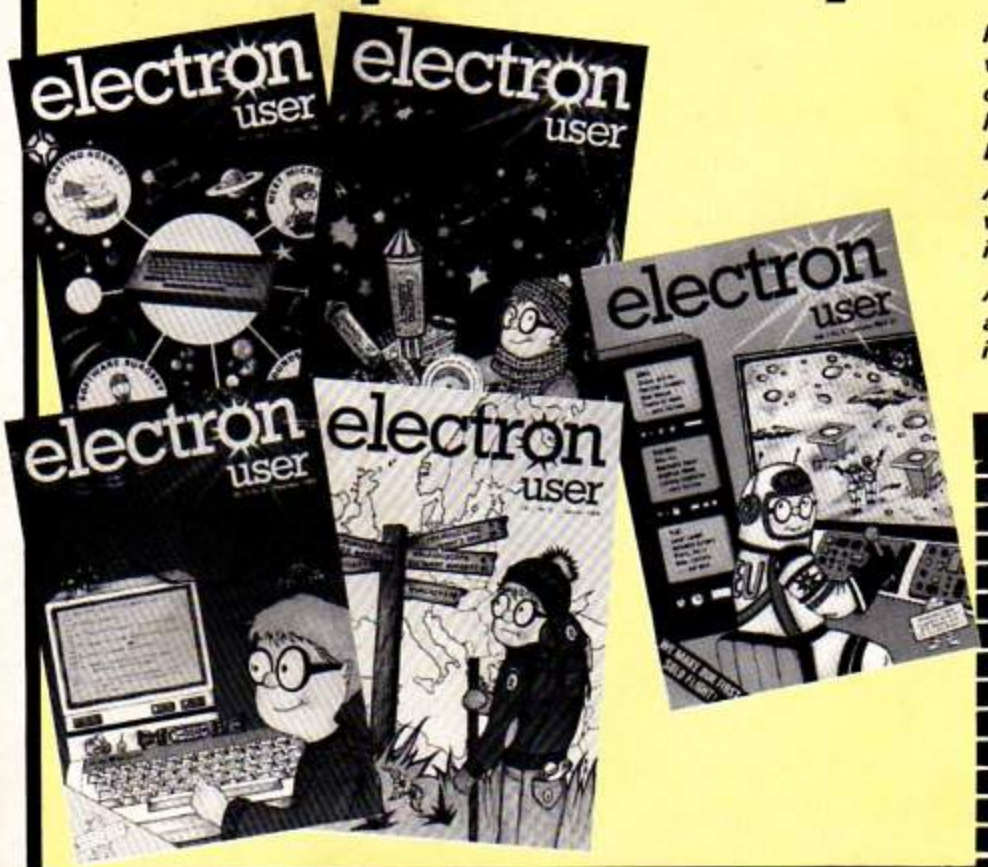
From Page 51

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter is given on Page 4 of the February issue.

```
    and rating will then
    be"
280 PRINT "given."
290 PRINT "
          ";
300 PRINT '"     Press any
    key to start the test!";
310 *FX15,1
320 A=GET
    :CLS
330 VDU 20,23,255,255,255
    ,255,255,255,255,255
    ,255
340 A$=CHR$ 255+CHR$ 255+
    CHR$ 255
    :B$=CHR$ 32+CHR$ 32+
    CHR$ 32
350 FOR I%=1TO 30
    :PRINT TAB(8)A$
    :NEXT
360 FOR I=0TO 7
    :READ M$(I)
    :NEXT
370 I%=0
    :X=RND(-TIME )
380 *FX15,1
390 ENDPROC
400 DEF PROCWAIT
410 NX=1
    :PROCCOLOUR
    :NX=3
    :PROCCOLOUR
    :*FX15,1
420 NX=2
    :PROCCOLOUR
430 ENDPROC
440 DEF PROCTEST
450 IF INKEY (0)<>-1
    THEN PROCTOOSOON
    :RUN
460 PRINT TAB(18,8)"Time="
    TAB(12,12)"Hundredths
     of a second"TAB(0,0);
470 TIME =0
    :REPEAT PRINT TAB(8
    ,I%)B$
    :PRINT TAB(12,10)
    TIME
    :I%=I%+1
    :UNTIL I%=300R INKEY (-99
    )
    :T%=TIME
480 ENDPROC
490 DEF PROCCOLOUR
500 FOR I=1TO 1000+RND(3000)
    :NEXT
    :VDU 19,1,NX,0,0,0,7
510 ENDPROC
520 DEF PROCTOOSOON
530 CLS
    :PRINT TAB(1,10)"WAIT
     FOR THE GREEN LIGHT!!!!"
    :FOR I=1TO 1000
    :NEXT
    :*FX15,1
540 A=INKEY (3000)
550 ENDPROC
560 DEF PROCMESSAGE
570 CLS
    :PRINT TAB(0,10)"You
     took "STR$ (T%-1)" hundr
    edths of a second"''
    "you are "M$(T%/10)
580 FOR I=1TO 1000
    :NEXT
    :*FX15,1
590 PRINT '''''''
      PRESS ANY KEY"
600 ENDPROC
610 DATA EXCELLENT,VERY
    GOOD,GOOD,RATHER POOR
    ,POOR,DISGRACEFUL,NEARLY
    ASLEEP,ASLEEP
```

This listing is included in this month's cassette tape offer. See order form on Page 45.

Catch up on what you've missed!



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Chicken listing

From Page 37

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter is given on Page 4 of the February issue.

```
 10 MODE 6
 20 PROCInstruct
 30 REPEAT
 40 MODE 5
 50 PROCInitial
 60 PROCPlay
 70 PROCResult
 80 UNTIL end
 90 RUN
100 REM ***** Initial
    *****
110 DEF PROCInitial
120 FOR I=1TO 2
    :speed(I)=0
    :steer(I)=0
    :distance(I)=0
    :count(I)=40
    :skid(I)=0
    :y(I)=736
    :NEXT
130 going=0
    :spin=0
    :car=0
    :collision=0
    :ditch=0
    :wall=0
    :end=0
    :x(1)=32
    :x(2)=1184
140 VDU 19,3,6;0;
150 MOVE 32,800
    :MOVE 32,820
    :GCOL 0,1
    :PLOT 85,1247,800
    :PLOT 85,1247,820
160 MOVE 32,640
    :MOVE 32,620
    :PLOT 85,1247,640
    :PLOT 85,1247,620
170 COLOUR 1
    :PRINT TAB(6,1)"CHICKEN
    "
180 COLOUR 2
    :PRINT ''"CAR 1";
    :COLOUR 3
    :PRINT SPC (10)"CAR
     2"
    :VDU 5
190 ENDPROC
200 REM ***** Instruct
    *****
210 DEF PROCInstruct
220 VDU 23,240,102,0,126
    ,255,255,126,0,102
230 VDU 23,241,0,0,126
    ,255,255,126,0,0,23
    ,242,8,28,42,73,8
    ,8,8,0
240 DIM speed(2),steer(2)
    ,distance(2),count(2)
    ,skid(2),x(2),y(2)
250 PRINT TAB(16,1)"CHICKEN
    "''''" Car 1 and Car
     2 race at each other.
     It is chicken to turn
     away first. To win
       you must have covere
    d more road than theoth
    er car. You loose if
     you crash or"
260 PRINT "fail to stop.
     Be careful about steer
    ing when moving fast,
     you may skid."
    TAB(16,13)"CONTROLS"
    TAB(7,15)"CAR 1"
    SPC (15)"CAR 2"
270 PRINT 'SPC (9)"D
      accelerator    L"'
    SPC (8)"ctrl     brake
        return"'SPC (9)
    "W     steer up
      "CHR$ (242)'
    SPC (9)"Z    steer
     down     /"
280 PRINT '"   PRESS SPACE
     TO SEE WHO'S  CHICKEN!
    "
    :REPEAT UNTIL GET =32

290 ENDPROC
300 REM ***** Move(n)
    *****
310 DEF PROCMove(n)
320 IF (going AND n)=n
    THEN PROCStopped(n)
    :ENDPROC
330 IF (spin AND n)=n

    THEN steer(n)=skid(n)
340 GCOL 0,0
    :MOVE x(n),y(n)
    :VDU 240
    :x(n)=x(n)+speed(n)
    :y(n)=y(n)+steer(n)
350 GCOL 0,1
    :MOVE x(n),y(n)
    :VDU 240
    :GCOL 0,n+1
    :VDU 8,241
360 SOUND 17,-15,speed(1)-s
    peed(2),10
370 ENDPROC
400 REM ***** Play *****
410 DEF PROCPlay
420 REPEAT
430 PROCReadkeys
440 PROCMove(1)
    :PROCMove(2)
450 PROCTest
460 UNTIL going=3AND (count
    (1)>199OR speed(1)=0)
    AND (count(2)>199
    OR speed(2)=0)
470 ENDPROC
500 REM ***** Readkeys
    *****
510 DEF PROCReadkeys
520 speed(1)=speed(1)-1.5*
    INKEY (-51)+3*INKEY (-2
    )
    :IF speed(1)<0
    THEN speed(1)=0
530 speed(2)=speed(2)+1.5*
    INKEY (-87)-3*INKEY (-7
    4)
    :IF speed(2)>0
    THEN speed(2)=0
540 steer(1)=INKEY (-98)-
    INKEY (-34)
    :IF distance(1)=0
    AND steer(1)<>0
    THEN distance(1)=x(1)
    ELSE steer(1)=steer(1)*
    speed(1)/4
550 steer(2)=(INKEY (-58)-
    INKEY (-105))*speed(2)/
    4
    :IF distance(2)=0
    AND steer(2)<>0
    THEN distance(2)=x(2)
560 ENDPROC
600 REM ***** Result *****
610 DEF PROCResult
620 VDU 4
    :PRINT TAB(0,13)
    :IF collision=1
    THEN PRINT "  You both
     crashed!"'
    ELSE IF car=3
    THEN PROCWinner
    ELSE PROCStatus(1)
    :PROCStatus(2)
630 COLOUR 1
    :PRINT '"  PRESS ANY
     KEY OR"''"   RETURN
     TO SEE"''" INSTRUCTION
    S AGAIN";
640 FOR I=0TO 2000
    :NEXT
650 *FX15,0
660 end=GET =13
670 ENDPROC
700 REM ***** Status(n)
```

Turn to Page 55

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Chicken listing

From Page 53

```
     *****
710 DEF PROCStatus(n)
720 COLOUR n+1
    :PRINT "Car ";n;" ";
    :IF (spin AND n)=n

    THEN PRINT "skidded,"'
730 IF (wall AND n)=n

    THEN PRINT "over ran"'
740 IF (ditch AND n)=n

    THEN PRINT "hit the
     ditch"'
750 IF (wall AND n)=n
     OR (ditch AND n)=n

    THEN PRINT "and crashed
    !"'
    :
        ELSE PRINT "won!"'
760 PRINT
770 ENDPROC
800 REM ***** Stopped(n)
     *****
810 DEF PROCStopped(n)
820 IF count(n)>199
    THEN ENDPROC
830 count(n)=count(n)+16
    :car=car AND (3-n)
    :speed(n)=5
840 MOVE x(n),y(n)
    :GCOL 3,RND(3)
    :PLOT 1,count(n)-2*
    RND(count(n)),count(n)-
    2*RND(count(n))
850 SOUND 16,-15,6,10
860 ENDPROC
900 REM ***** Test *****
910 DEF PROCTest
920 IF ABS (x(2)-x(1))<64
    AND ABS (y(2)-y(1))<32
    THEN collision=1
    :going=3
930 PROCTest1(1)
    :PROCTest1(2)
940 ENDPROC
1000 REM ***** Test1(n)
     *****
1010 DEF PROCTest1(n)
1020 IF x(1)>x(2)AND speed(n
    )=0
    THEN going=going
    OR n
    :IF count(n)<41
    THEN count(n)=200
    :car=car OR n
1030 IF y(n)>800OR y(n)<672
    THEN ditch=ditch
    OR n
    :going=going OR n
1040 IF RND(ABS (speed(n)))>
    20AND steer(n)AND
    RND(7)>5
    THEN spin=spin
    OR n
    :skid(n)=4*SGN (
    RND(2)-1.5)
1050 IF x(n)>1184OR x(n)<32
    THEN wall=wall
    OR n
    :going=going OR n
1060 ENDPROC
1100 REM ***** Winner ******
1110 DEF PROCWinner
1120 IF distance(1)>1216-dis
    tance(2)OR distance(1)=
    0
    THEN PRINT "Car 1";
    ELSE PRINT "Car 2";
1130 PRINT " is the winner!"
1140 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 45.

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Cheques, P.O.s Trade enquiries welcome

From Page 13

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter is given on Page 4 of the February issue.

```
    "
250 PRINT
260 *FX202,48
270 INPUT ".................
    .."B$
280 IF ASC (B$)>64AND
    ASC (B$)<91
    THEN PRINT TAB(0,4)
    CHR$ (136);CHR$ (130);
    "NOT CAPITALS: CAPS and
     SHIFT LOCK off."
290 IF ASC (B$)>64AND
    ASC (B$)<91
    THEN INPUT "
         PRESS RETURN TO
     CONTINUE"Z$
300 IF Z$=""
    THEN 310
    ELSE 290
310 IF ASC (B$)>64AND
    ASC (B$)<91AND Z$=""
    THEN 210
312 IF B$="giveup"OR B$=
    "givein"
    THEN PROCchicken
320 IF KK>1AND KK<4AND
    LEN B$<3
    THEN PRINT TAB(0,6)
    STRING$(40,CHR$ (32))
330 IF KK>1AND KK<4AND
    LEN B$<3
    THEN 240
360 G=G+1
370 IF B$<D$ OR B$>E$
    THEN SOUND 3,-15,5,30
380 IF B$<D$ OR B$>E$
    THEN 210
390 B=INT (LEN (B$)/2)
400 IF B$<A$(A)
    THEN PROCearly
410 IF B$<A$(A)
    THEN D$=B$
420 IF B$>A$(A)
    THEN PROClate
430 IF B$>A$(A)
    THEN E$=B$
440 IF B$=A$(A)
    THEN PROCcorrect
450 IF D=0
    THEN 470
460 FOR Z=1TO 5000
    :NEXT Z
470 IF D=0
    THEN 210
    ELSE PROCend
480 IF Z$="y"
    THEN PROCchoose
490 IF Z$="y"
    THEN 80
500 CLS
    :PRINT TAB(0,10)"Thanks
     for the game."
520 REM
530 DATA and,ask,all,add
    ,after,am,an,are,apple
    ,arm,bat,band,bag,bet
    ,bell,bend,book,but
    ,bull,bone,cat,cap,can
    ,cab,cake,car,cot,chat
    ,chip,chin,dig,dip,did
    ,done,day,egg,eat,end
    ,even,east
540 DATA fan,far,fat,full
    ,fun,feel,food,farm
    ,fed,fit,gun,get,good
    ,got,goal,had,hat,head
    ,hear,hut,in,ink,ill
    ,into,it,jet,jab,jog
    ,jump,jot,kit,king,key
    ,lap,log,lot,leg,last
    ,low,let
550 DATA mat,mate,met,meet
    ,meat,mug,moon,man,mist
    ,mint,not,no,near,nose
    ,new,on,only,old,open
    ,oak,pet,pat,put,pot
    ,pig,quick,queen,rat
    ,red,rip,sat,sit,sun
    ,so,sad,tan,tip,top
    ,two,tea
560 DATA under,up,use,vet
    ,van,wet,went,will,where
    ,who,yet,yellow,yes
    ,you,zoo
570 DATA abbey,abbot,abide
    ,accelerate,access,accomp
    any,actual,adder,affirm
    ,apprentice,babe,baffle
    ,bagpipes,barren,bass
    ,beauty,bloat,booth
    ,brag,buckle,cabinet
    ,cabbage,carpenter,caulif
    lower,chafe,character
    ,chubby,circumstance
    ,civil,colic
580 DATA dabble,decorate
    ,design,degrade,dimension
    ,dingy,duchess,drudge
    ,docile,divine,eager
    ,elaborate,elevate,emblem
    ,enlighten,episode,equate
    ,erupt,exchange,express
    ,fable,factor,falcon
    ,familiar,fend,filly
    ,figure,flour,foam,fourte
    enth
590 DATA gable,gallop,garter
    ,gangway,geology,ghastly
    ,giggle,gnat,graft,guide
    ,halter,hamburger,hamlet
    ,helicopter,hermit,horizo
    n,horde,hutch,hypnosis
    ,hydrant,idiot,illegal
    ,illuminate,important
    ,inflate,inject,inquest
    ,insult,iodine,invest
600 DATA jackboot,jackdaw
    ,jewel,jingle,jockey
    ,jive,judo,jumble,jungle
    ,junction,kangaroo,keel
    ,kettle,kidnap,kilt
    ,kitchen,kneel,know
    ,knit,kipper,ladder
    ,ladle,lamb,lance,lantern
    ,laugh,lever,library
    ,loiter,lollipop
610 DATA machine,mackerel
    ,magistrate,marine,meteor
    ,mischief,miser,moderate
    ,muscle,mutiny,nail
    ,napkin,nature,needle
    ,nerve,notch,nylon,nurse
    ,notice,nothing,oasis
    ,objective,obstacle
    ,obtain,official,orange
    ,ordeal,otter,ounce
    ,overtake
620 DATA pace,paddle,painter
    ,panther,partner,passenge
    r,pension,pepper,pigeon
    ,plague,racket,radio
    ,ramble,rash,remove
    ,respect,robot,rummage
    ,rustle,rung,sacrifice
    ,saint,salmon,sample
    ,scarlet,scrounge,second
    ,seesaw,serve,severe
630 DATA tablet,tapestry
    ,tattoo,teach,telephone
    ,thatch,tight,tongs
    ,tramp,trample,umbrella
    ,umpire,uncle,underground
    ,unicorn,uniform,upright
    ,usual,united,until
    ,vacant,vacuum,valley
    ,value,vampire,vandalism
    ,vanish,vein,venom,verse
640 DATA wade,wafer,wages
    ,wallet,warden,wasp
    ,watch,wax,weave,weird
    ,xylophone,yacht,yard
    ,year,yeast,yesterday
    ,yoga,yolk,young,youth
    ,zebra,zero,zigzag,zip
    ,zoom
650 DATA abacus,abated,abbato
    ir,ablution,actuate
    ,acumen,adulterate,affili
    ate,aileron,alkali,alum
    ,anthrax,antitoxin,apocal
    ypse,apoplexy,aquiline
    ,asphalt,asphyxiation
    ,aspic,attenuate,auk
    ,awry,axiom,axial,aisle
660 DATA baccarat,bagatelle
    ,baize,ballistics,banshee
    ,barbarous,barbecue
    ,barracuda,bauble,bazooka
    ,bazaar,beaux,bedraggled
    ,bibliography,binary
    ,biographical,blithesome
    ,bludgeon,blurt,bogus
    ,boracic,braille,bunion
    ,burly,butterscotch
670 DATA cache,caffeine
    ,cajole,calibre,calligrap
    hy,callow,camphor,canniba
    listic,capillary,casement
    ,cashmere,cataclysmal
    ,cauldron,caustic,caw
    ,cessation,chamois,cheque
    red,cheroot,cloche,coerce
    ,crypt,crucible,cubism
    ,cygnet
680 DATA dachshund,dangle
    ,dapple,debilitate,decarb
    onisation,decry,deem
    ,defer,degenerate,detonat
    e,devoid,diaphanous
    ,digit,digress,dimple
    ,dire,disciple,disgorge
    ,ditty,divest,divot
    ,domain,doublet,dragoon
```

```
    ,droll
690 DATA earl,easel,eaves
    ,echelon,ecology,ecstasy
    ,editorial,effervesce
    ,effigy,elapse,electrothe
    rapy,elixir,encompass
    ,endow,ensign,ermine
    ,espy,etch,eunuch,exalt
    ,exorcise,extricate
    ,eye,extol,ethnic
700 DATA facia,faction,fang
    ,farce,farrier,fatigue
    ,fauna,feign,feline
    ,ferrous,ferrule,festoon
    ,fettle,feudalism,fidget
    ,fiery,finch,firkin
    ,flagon,flax,forceps
    ,forge,frieze,frugal
    ,fulmar
710 DATA gable,gaiety,galore
    ,gambit,gantry,garish
    ,garrulous,geophysics
    ,gesticulate,geyser
    ,gherkin,ghetto,gibber
    ,gigolo,goitre,gossamer
    ,grebe,gristle,guise
    ,gurgle,gurnard,guzzle
    ,gypsum,gyrate,grope
720 DATA haft,haggis,hake
    ,hale,halibut,hallow
    ,hank,hearse,heckle
    ,heifer,helical,heinous
    ,hieroglyph,homage,hookah
    ,hovel,hubbub,hue,humify
    ,humiliate,hunch,hurtle
    ,hydra,hyphen,hypothesis
730 DATA ichthyology,igloo
    ,ignoble,illegible,illici
    t,imago,immune,impend
    ,impetus,incantation
    ,incense,indigo,indolent
    ,induce,ionise,iridescent
    ,irk,irony,irradiate
    ,isosceles,isotherm
    ,issue,isthmus,invert
    ,invest
740 DATA jabber,jacknife
    ,jamb,jangle,jape,jasper
    ,jaunty,jealous,jeopardy
    ,jetsam,jilt,jocular
    ,joggle,jostle,joust
    ,jubilation,judiciary
    ,jugular,juniper,juxtapos
    ition,kaleidoscope,kaolin
    ,kedgeree,khaki,knightly
750 DATA laburnun,lacerate
    ,laconic,lacquer,laity
    ,laminate,lamprey,languis
    h,laudanum,lascivious
    ,lecher,lectern,legion
    ,leveret,lichen,lieutenan
    t,lilt,limbo,loganberry
    ,logistics,loin,longevity
    ,loofah,lope,lotion
760 DATA macaw,madrigal
    ,magenta,mahlstick,maim
    ,malleable,mamba,manacle
    ,mediocre,megalith,menial
    ,mesmerise,meteor,mettle
    ,micrometer,mimosa,minim
    ,minuet,mnemonic,moccasin
    ,modulate,moult,mucus
    ,myrrh,myxomatosis
770 DATA narcissus,narcosis
    ,natal,nausea,nebula
    ,negate,neigh,nephew
    ,nestle,neural,neuter
    ,newt,nimble,nocturne
    ,nomadic,nonentity,nostal
    gia,notch,nuptial,nurture
    ,nymph,nylon,nudge,nougat
    ,nodule
780 DATA oakum,obelisk,obliqu
    e,obscene,obviate,occult
    ,ocean,ocelot,ochre
    ,octet,ocular,omega
    ,omen,omnivorous,onerous
    ,onion,ophthalmic,opulant
    ,orchid,ordnance,orphan
    ,ovation,owlet,oxide
    ,ozone
790 DATA palette,papal,parado
    x,pedant,percolate,permea
    te,phial,phlox,pierce
    ,piquant,pliable,plumage
    ,posy,prefix,prophylactic
    ,prude,pylon,pyre,pyromet
    er,proctor,prior,pout
    ,poop,plankton,pinion
800 DATA quaff,quail,quell
    ,quip,quire,quoit,quotien
    t,raffia,rancid,ratchet
    ,recidivist,recluse
    ,reflex,rhetoric,ribald
    ,ricochet,rotor,roundel
    ,rowel,rue,russet,rustic
    ,revue,remiss,rejuvinate
810 DATA sachet,saffron
    ,salient,salver,scarab
    ,sceptre,schedule,scimita
    r,scree,scythe,seance
    ,seethe,sepia,seraph
    ,shekel,shingle,sienna
    ,signet,silhouette,skein
    ,slake,squeegee,strafe
    ,strew,sultry
820 DATA taboo,tabular,tallow
    ,tapioca,taunt,tedium
    ,tempest,tenacious,tendri
    l,tentative,termite
    ,tertiary,thespian,threw
    ,tier,tinder,torsion
    ,tourniquet,tract,tranqui
    l,trauma,trellis,trifle
    ,tripartite,turmoil
830 DATA udder,ullage,umber
    ,uncouth,urchin,urge
    ,usher,utility,utterance
    ,usurp,vague,valiant
    ,vanilla,varlet,vector
    ,vegetate,vehicle,veneer
    ,venison,vertigo,vespers
    ,veto,vicinity,viola
    ,virtuoso
840 DATA waddle,waft,waif
    ,wan,wand,wanton,warbler
    ,warlock,wary,weft,wharf
    ,wheedle,whelk,whelp
    ,whet,whiff,wield,wiggle
    ,wilful,winkle,withe
    ,wrack,wrest,wright
    ,wrought
850 DATA yashmak,yaw,yelp
    ,yeoman,yokel,zenith
    ,zephyr,zest,zither
    ,zodiac
860 END
870 REM
880 DEF PROCearly
890 PRINT TAB(5,13)"
                    "
900 PRINT TAB(20-B,13)B$
910 ENDPROC
920 REM
930 DEF PROClate
940 PRINT TAB(5,19)"
                    "
950 PRINT TAB(20-B,19)B$
960 ENDPROC
970 REM
980 DEF PROCcorrect
990 PRINT TAB(0,16)"
                              "
1000 PRINT TAB(18-B,16)
     CHR$ (136);CHR$ (130);B$
1010 D=D+1
1020 ENDPROC
1030 REM
1040 DEF PROCend
1050 CLS
1060 PRINT TAB(0,4)"Yes, the
     word was ";CHR$ (34);A$(
     A);CHR$ (34)
1070 IF G>1
     THEN PRINT TAB(0,7)"You
     took ";G;" guesses to
     find the word."
1080 IF G=1
     THEN PRINT TAB(0,7)"You
     took ";G;" guess to
     find the word."
1090 IF G<4
     THEN PRINT TAB(0,8)"(Have
     you filled in your pools
     today?)"
1100 PRINT TAB(0,10)"You said
     you would take ";GG
1110 IF G>GG
     THEN PRINT TAB(0,13)
     "You LOST. You buy the
     coffee."
1120 IF GG>G
     THEN PRINT TAB(0,13)
     "OK.,don't keep on. I
     know you won."
1130 IF GG=G
     THEN PRINT TAB(0,13)
     "We'll call that one
     quits."
1140 *FX202,48
1150 PRINT TAB(0,20)"RETURN
     y if you wish to play
     again              or
     n to END."
1160 INPUT Z$
1170 IF Z$<>"y"AND Z$<>"n"
     THEN 1150
1180 ENDPROC
1190 REM
1200 DEF PROCintro
1210 CLS
1220 PRINT
     :PRINT
     :PRINT "Teacher,"
1230 PRINT "        This
     program gives practice
        with the concept
     of alphabetical order.
     It is in the form of
     a game, the rules  of
     which are explained
     overleaf."
1240 PRINT
     :PRINT "The game may
     be played with or withou
     t  the aid of a dictionar
     y, as you choose, but
     no words of less than
     three letters will be
     accepted except at level
```

→

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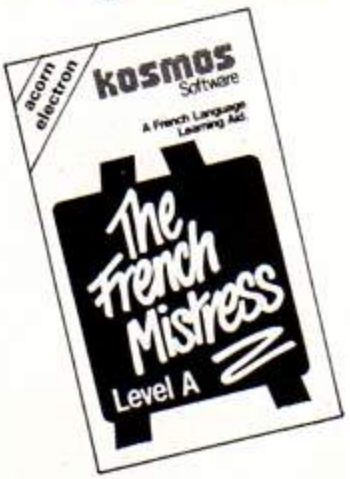

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Australian Coffee listing

From Page 57

```
     No.1."
1250 PRINT
     :PRINT "Lower case letter
     s are used throughout,
      so make sure CAPS LOCK
      is off.          (that
      is, the light is out)."
1260 PRINT
     :PRINT "After any respons
     e has been made it must
      be entered by pressing
      RETURN."
1270 PRINT TAB(0,22)"Press
      RETURN to continue."
1280 INPUT z$
     :IF z$<>""
     THEN 1270
1290 CLS
     :PRINT TAB(0,5)"Just
      one more point before
      we go; if    you are
      unable to find the word
      and you wish to give
      up, simply respond to
      the  prompt by typing
      ";CHR$ (34);"giveup";
     CHR$ (34)
1292 PRINT
     :PRINT "After doing this
      you will need to press
      the ESCAPE key and re-RU
     N the program."
1294 PRINT TAB(0,20)"Press
      RETURN to continue."
1296 INPUT z$
     :IF z$<>""
     THEN 1294
1298 CLS
1300 PROCchoose
1310 CLS
     :PRINT
     :PRINT
     :PRINT "        AUSTRALI
     AN COFFEE GAME."
1320 PRINT "       **********
     **************"
1330 PRINT
     :PRINT "They tell me
      this game is played
      in     cafes in Australi
     a to decide who is to
       pay for the coffee.
      The idea is that one
      player thinks of a word
      and writes it   down
      without the second playe
     r seeing"
1340 PRINT "it. The second
      player then states how
        many guesses he will
      need to find what  the
      word is. If the number
      of guesses   stated
      is acceptable to the
      first       player,
      the game proceeds."
1350 PRINT "   As each guess
      is made by the second
       player, the first playe
     r tells him      whether
      it is alphabetically
      earlier or alphabeticall
     y later than the hidden"
1360 PRINT "word. The aim
      of the  second player
      is  to move closer and
      closer to the word
       until he finds it."
1370 PRINT
     :PRINT
     :INPUT "PRESS THE RETURN
      KEY TO CONTINUE."Z$
1380 CLS
     :PRINT
     :PRINT
     :PRINT "The computer/teac
     her will choose a word
      and the computer will
      draw a line to    repres
     ent it. It will then
      ask you to   guess what
      the word is."
1390 PRINT
     :PRINT "Incorrect guesses
      which are
        alphabetically earlier
      than the         hidden
      word will be printed
      above the   line; guesse
     s alphabetically later
      will be printed below."
1400 PRINT
     :PRINT "Guesses which
      move further away from
      thehidden word instead
      of nearer to it will
      be beeped and will count
      as a try."
1410 PRINT
     :PRINT
     :INPUT "PRESS THE RETURN
      KEY TO CONTINUE."Z$
1420 ENDPROC
1430 REM
1440 DEF PROCdeal
1450 AA$="="
     :BB$="="
     :CC$=""
     :AA=0
     :BB=0
     :CC=0
     :DD=0
     :EE=0
     :FF=0
     :GG=0
     :A$(181)=""
1460 CLS
     :PRINT
     :INPUT "Right then, cobbe
     r, how many guesses do
      you think you'll need
      to find this word of
      mine?"GG
1470 PRINT
     :IF GG>30
     THEN PRINT "Not a chance,
      pal. Drop it to somethin
     g  under 30 or we aren't
      even talking."
1480 IF GG>30
     THEN INPUT GG
1490 IF GG>30
     THEN 1480
1500 IF GG>12
     THEN 1820
1510 PRINT
     :IF GG<8
     THEN PRINT "O.K. I accept
      that."
1520 IF GG<8
     THEN 2040
1530 AA=RND(3)
1540 IF AA=1 AND GG>=8
     AND GG<=12
     THEN PRINT "Hmm, go on
      then, I accept."
1550 IF AA=1 AND GG>=8
     AND GG<=12
     THEN 2040
1560 IF AA=2 AND GG>=8
     AND GG<=12
     THEN PRINT "No, not this
      time. How about ";GG-2;
     " ?"
1570 IF AA=3 AND GG>=8
     AND GG<=12
     THEN PRINT "I suggest
      we make that ";GG-4
1580 PRINT
     :IF AA=2 AND GG>=8
     AND GG<=12
     THEN INPUT "RETURN y
      OR n   "AA$
1590 PRINT
     :IF AA=3 AND GG>=8
     AND GG<=12
     THEN INPUT "RETURN y
      OR n   "AA$
1600 IF AA$<>"y" AND AA$<>
     "n"AND AA$<>"="
     THEN 1580
1610 IF AA$="y" AND AA=2

     THEN GG=GG-2
1620 IF AA$="y" AND AA=3

     THEN GG=GG-4
1630 IF AA$="y"
     THEN 2080
1640 IF AA$="n"
     THEN PRINT "OK, What
      do you suggest";
1650 IF AA$="n"
     THEN INPUT BB
1660 PRINT
     :IF AA=2 AND BB<=GG-1

     THEN PRINT "Yes, I accept
     ."
1670 IF AA=2 AND BB<=GG-1

     THEN 2040
1680 IF AA=2 AND BB>GG-1

     THEN PRINT "Not good
      enough, my friend. Try
      again."
1690 IF AA=2 AND BB>GG-1

     THEN INPUT CC
1700 IF AA=2 AND CC<=GG-1

     THEN 2040
1710 PRINT
     :IF AA=2 AND CC>GG-1
```

→

Australian Coffee listing

From Page 59

```
    THEN PRINT "OK. Don't
     play."
1720 IF AA=2 AND CC>GG-1

    THEN 1720
1730 IF AA=3 AND BB<=GG-2

    THEN PRINT "Yes, I'll
     take that."
1740 IF AA=3 AND BB<=GG-2

    THEN 2040
1750 PRINT
    :IF AA=3 AND BB>GG-2

    THEN PRINT "Huh. I'll
     go to ";GG-3;" but not
     less.  Answer y or n"
1760 IF AA=3 AND BB>GG-2

    THEN INPUT BB$
1770 IF BB$<>"y" AND BB$<>
    "n"AND BB$<>"="
    THEN 1760
1780 IF BB$="y"
    THEN GG=GG-3
1790 IF BB$="y"
    THEN 2080
1800 PRINT
    :IF BB$="n"
    THEN PRINT "If that's
     the way you want it,
     then buy yer own rotten
     coffee, cobber."
1810 IF BB$="n"
    THEN GOTO 1810
1820 DD=RND(6)
1830 IF DD=5
    THEN 1910
1840 PRINT
    :IF DD=4 OR DD=6
    THEN PRINT "OK. Anything
     goes. ";GG;" it is."
1850 IF DD=4 OR DD=6
    THEN 2040
1860 PRINT
    :IF DD=1 OR DD=2
    OR DD=3
    THEN PRINT "Sorry, chum,
     don't think I can accept
     a number more than 12.
     Give me a number  below
     that and I'll consider
     it."
1870 IF DD=1 OR DD=2 OR DD=3

    THEN INPUT EE
1880 PRINT
    :IF EE<=12
    THEN GG=EE
    ELSE PRINT "S'long then."
1890 IF EE>12
    THEN 1890
1900 IF EE<=12
    THEN 2040
1910 PRINT
    :IF DD=5
    THEN PRINT "Don't muck
     about. Make it ";GG-10;
     " or we stop  talking
     now."
1920 PRINT
    :IF DD=5
    THEN INPUT "Answer y
     or n."CC$
1930 IF CC$="y"
    THEN GG=GG-10
1940 IF CC$="y"
    THEN 2040
1950 PRINT
    :IF CC$="n"
    THEN PRINT "Well, make
     an offer."
1960 IF CC$="n"
    THEN INPUT FF
1970 PRINT
    :IF FF>GG-8
    THEN PRINT "Not today,
     tiger."
1980 IF FF>GG-8
    THEN 1980
1990 IF FF<GG-8 AND FF<=8

    THEN GG=FF
2000 IF FF>=8 AND FF<=12

    THEN 1530
2010 IF FF>12
    THEN PRINT "I think we
     should start again."
2020 PRINT
    :INPUT "PRESS RETURN
     TO CONTINUE."ZZ$
2030 IF ZZ$=""
    THEN 1450
    ELSE 2020
2040 PRINT
2050 IF AA=2 AND BB<=GG-1
     AND CC=0
    THEN GG=BB
2060 IF AA=2 AND CC<=GG-1
     AND CC<>0
    THEN GG=CC
2070 IF AA=3 AND BB<=GG-2

    THEN GG=BB
2080 PRINT "You say you will
     find the word in ";GG;
     "       guesses. You're
     on."
2090 PRINT
    :INPUT "PRESS RETURN
     TO CONTINUE."ZZ$
2100 IF ZZ$=""
    THEN ENDPROC
    ELSE 2090
2110 REM
2120 DEF PROCmyword
2130 A=181
    :CLS
2140 PRINT TAB(0,7)"Right
     then Teach; type in
     your chosen  word (use
     lower case letters)
     and press RETURN."
2150 PRINT "

          If, however, you
     wish the computer to
       choose the word then
     type ";CHR$ (34);"comp";
     CHR$ (34);" and    press
     RETURN."
2160 INPUT A$(A)
2170 IF ASC (A$(A))<97
    OR ASC (A$(A))>122
    THEN PRINT "*******Lower
     case please*******"
2180 IF ASC (A$(A))<97
    OR ASC (A$(A))>122
    THEN VDU 7
2190 IF ASC (A$(A))<97
    OR ASC (A$(A))>122
    THEN 2160
2200 IF A$(A)="comp"
    THEN ENDPROC
2210 CLS
    :PRINT TAB(0,5)"Now,
     haggle with your pupil
     and agree  on the maxim
     um number of tries he/she
     isallowed, to guess
     your word."
2220 PRINT
    :PRINT
    :INPUT "Type the number,
     press RETURN and hand
      over to your pupil."GG
2230 ENDPROC
2240 REM
2250 DEF PROCchoose
2260 CLS
    :PRINT TAB(0,3)"LEVEL
     1 --- simple, common,
     three and
         four letter words.
              LEVEL 2 ---
     common longer words."
2270 PRINT "LEVEL 3 --- long
     and short ";CHR$ (34);
     "interesting";CHR$ (34);
     "           words."
2280 PRINT
    :PRINT "Type 1, 2 or
     3 to choose the difficul
    ty level, and press RETUR
    N"
2290 PRINT "

          Type 4 and RETURN
     if you wish to choose
     a word of your own."
2300 INPUT KK
2310 IF KK<>1 AND KK<>2
    AND KK<>3 AND KK<>4

    THEN 2300
2320 IF KK=4
    THEN PROCmyword
2330 ENDPROC
2340 REM
2500 DEF PROCchicken
2502 CLS
2510 PRINT TAB(0,10)CHR$ (136)
    ;CHR$ (131);CHR$ (157);
    CHR$ (129);A$(A)
2520 PRINT TAB(0,14)"  YOU
     BUY THE COFFEE FOR THE
     NEXT YEAR,   (and the
     chicken sandwiches,
     Cobber)."
2530 GOTO 2530
2540 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 45.

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Micro messages

Thinking bigger

I AM a beginner at computing as I only received my Electron on December 23.

Please could you tell me how to produce double height characters as I am in the process of writing an educational program for my younger sister. I would be very grateful if you could do this. – **Paul Vanags.**

● You must have read our minds. We'll have a program that will do that (and more) fairly soon, hopefully in the next issue.

Software line-up

COULD you attempt to list the BBC software compatible with the Electron and hence widen the software base for Electron users?

Current information is too vague couched in terms like "should be", "may be slower" etc. – **Tom Paterson, Larkhall, Lanarkshire.**

● Frankly it would be an endless task. The commercial software that will run on the Electron is clearly marked as such, probably because no one wants to miss out on the extra market that the Electron gives.

As for the changes that might be necessary to run magazine games for the BBC, we'll be running an article on them soon.

Case of the lost line

A QUESTION which many readers will be interested in. When I switch on my Electron I seem to lose my first line.

*Alas, *TV255 doesn't work as someone had suggested and it is now getting on my nerves.*

Also will you please explain how to draw circles using VDU5 and COS and SIN RADS. – **Hasan Bobut, Batley.**

● Sadly *TV 255 won't work on the Electron as you have found out. It's a command that does work on the BBC Micro but won't on the Electron, which doesn't have the necessary micro chip.

Off hand we can't think of any way of remedying your problem, but having said that, we are sure someone will write in telling us how it can be done!

As for circles, take a look at the program by Mike Cook this month.

OS poser

WHILE you produced an excellent magazine for February one thing struck me as strange.

*In the letter entitled "Which OS?" you claim the Electron has OS 1.2, but when I typed in *HELP to find which OS I have, the computer replied with OS 1.00.*

Is my machine a dud? The serial number is 0011633 and it was bought in December. – **David Thornton, Henley-on-Thames.**

● No, your machine isn't a dud. The Operating System of the Electron is the 1.00. This, to all intents and purposes, can be looked on as the equivalent of the 1.2 OS of the BBC Micro.

Conversion is not on

I'VE been told that I will be able to convert my Electron into a BBC Micro. Is this true? – **Peter Grainger, Preston.**

● The short answer is no, though what with the hardware add-ons that are available and promised you'll eventually be able to get a very close approximation.

Stationary at LINE 210

USING the program Island on my introductory cassette my tape stops and BLOCK AT LINE 210 appears on the screen.

I had an Electron for Christmas and it had a faulty keyboard, so we took it back to the shop.

A week or so later I got a new Electron and to my horror on the program Island, BLOCK AT LINE 210 came up on the screen. – **Alix Vears, Wigginton, Herts.**

● Don't worry, I don't think it's your Electron. It might be that the tape itself is faulty – in which case your dealer will exchange it.

Or the volume and/or tone levels on your cassette recorder may need changing.

Not so available

I HAVE been the proud owner of an Acorn Electron for about two months and was pleased to see your publication inside the Micro User.

But one thing that has annoyed me is the availability of software for it. There is plenty of software advertised for the Electron but when you try to obtain them it's a different matter. – **Steven Douglas, Buckhurst Hill, Essex.**

● We must agree that a couple of months ago the software situation was fairly bad. Happily things have changed and practically every day a new batch of Electron software lands on our desk.

Iron Ring clanger

THE other day a friend of mine told me that he couldn't get January's Iron Ring program working.

This puzzled me as I'd entered it in with no problems. However, looking at his listing I saw that he had entered line 50 as:

```
VDU29,640+SIN (G)*100;
   512 +COS(G)*100
```

Of course this should be:

```
VDU29,640+SIN (G)*100;
   512 +COS(G)*100
```

with a comma after 29, not a full stop. Looking at his magazine I must admit that on his listing it did look that way. I thought maybe some of your readers might have had a similar problem. – **Mark Twigg, Glossop.**

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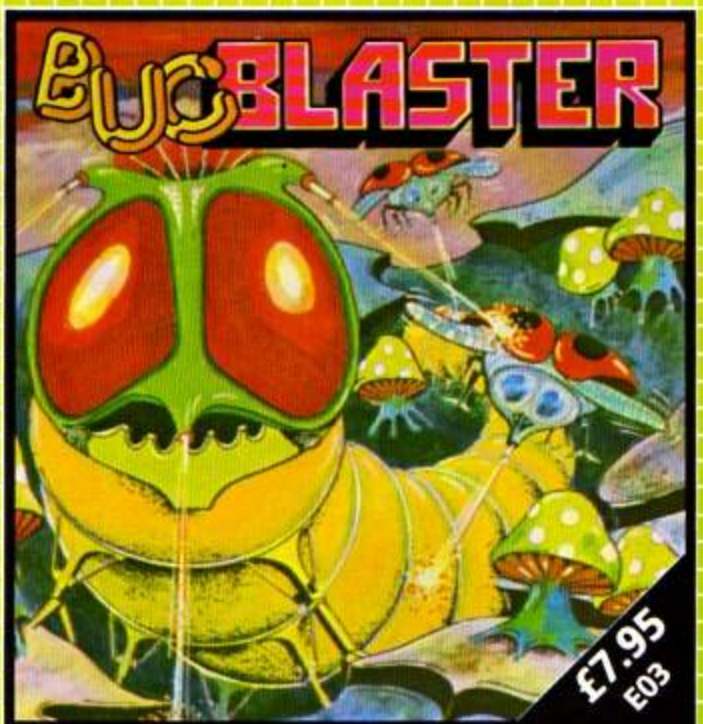

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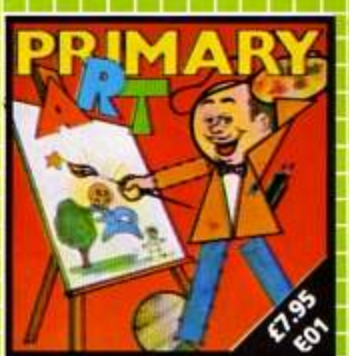

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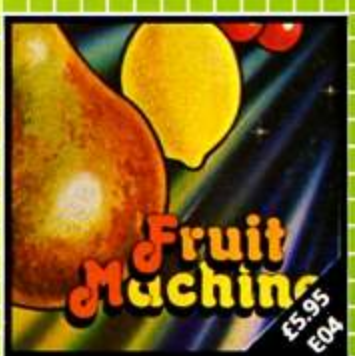

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